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AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·

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GAS PLANT ENGINEERS

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SAFE - ECONOMICAL
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BECKER TYPE OVENS

of CONSUMERS POWER COMPANY

at FLINT, MICHIGAN

THE FLINT PLANT of the Consumers Power Company consists of 29 producer gas underfired Becker type ovens with complete auxiliaries. Its daily gas capacity is 4,700,000 cubic feet.

This coal gas plant is the third to be built for Consumers by The Koppers Construction Company.

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PHENOL REMOVAL PLANTS, ETC.

The Koppers Construction Company

Designers and Builders of
BY-PRODUCT COKE AND GAS PLANTS

Chicago **New York** **Pittsburgh**

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*
Including GAS INDUSTRY Est. 1900

Executive and Editorial Offices, 53 Park Place, New York City

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H. M. RILEY, *Editor*

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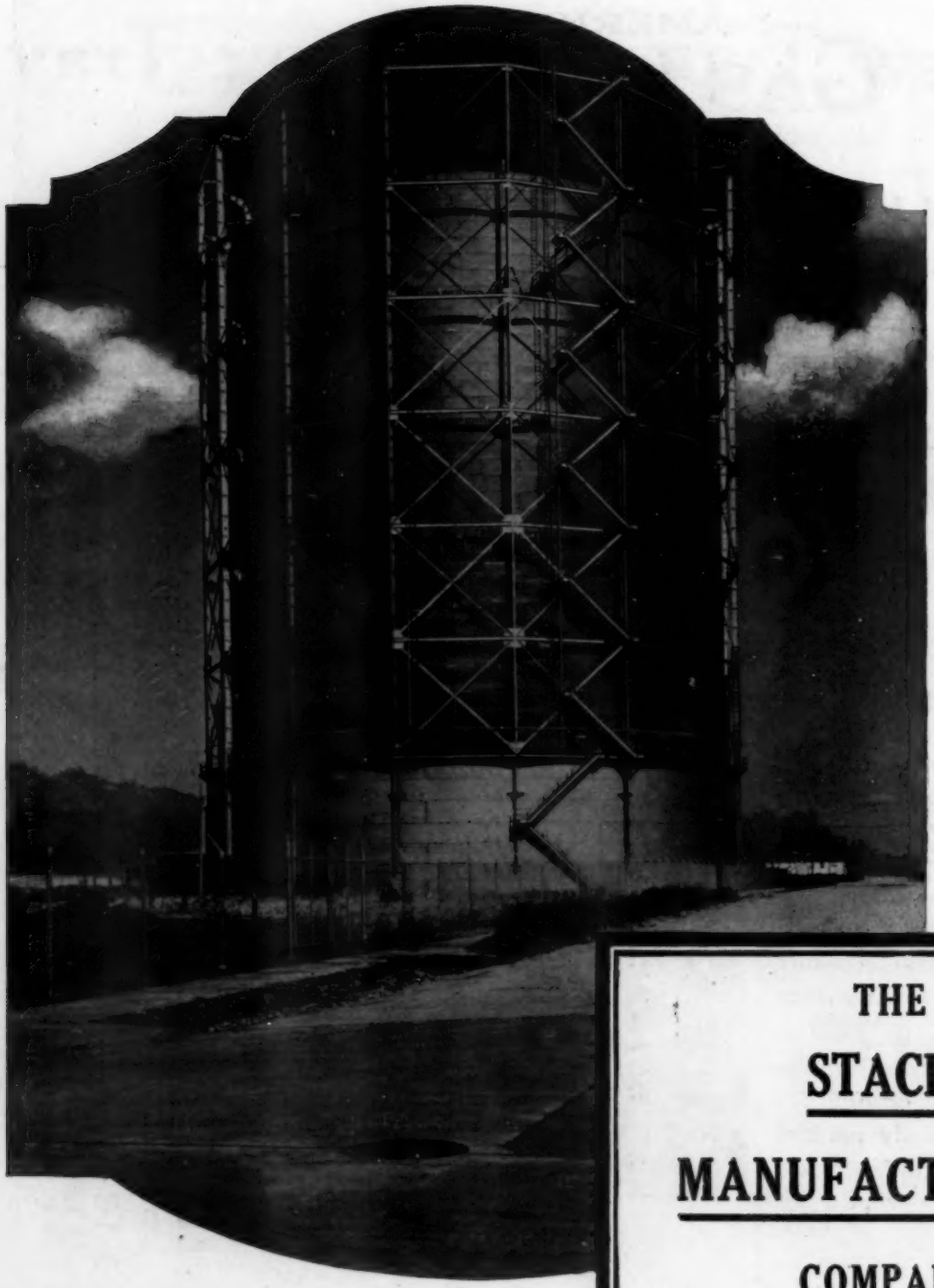


3,000,000 Cu. Ft. 5 Lift Gas Holder
Built for
The Nassau & Suffolk Lighting Co.
Long Beach, Long Island

77 Years of Service to the Gas Industry

THE

STACEY

MANUFACTURING

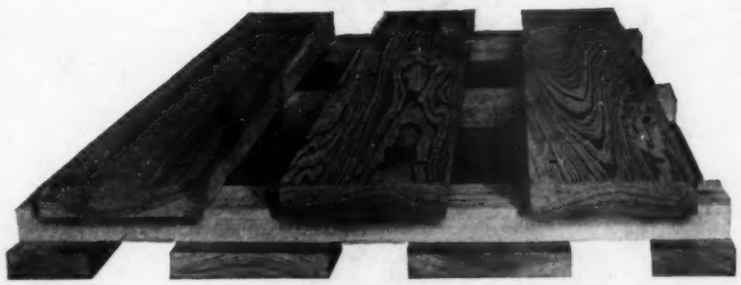
COMPANY

CINCINNATI, OHIO

NEW YORK OFFICE
52 Vanderbilt Ave.

This New Type of Purifier Tray

Is Corrosion Proof



Patent Applied for

No metal whatever is used in assembling this purifier tray. It is entirely free of any substance that yields to corrosive action. This important feature, added to the practical design which has made our trays so popular, will keep the maintenance cost of gas purification at the lowest possible point in your plant.

Our new corrosion proof purifier tray, is the invention of F. C. Wellington. It was developed through long experience with purifying equipment. Wooden dowels, accurately made and fitted, hold together the selected boards of cypress or white pine. Exposure to moisture only makes them fit tighter.

Trays of this construction have been found absolutely perfect after almost two years of service, requiring no repair of any kind.

Patent Applied for

Let us send you a sample tray for inspection and test. Then you can see for yourself how thoroughly it is built for its difficult task.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

Complete Gas Plants

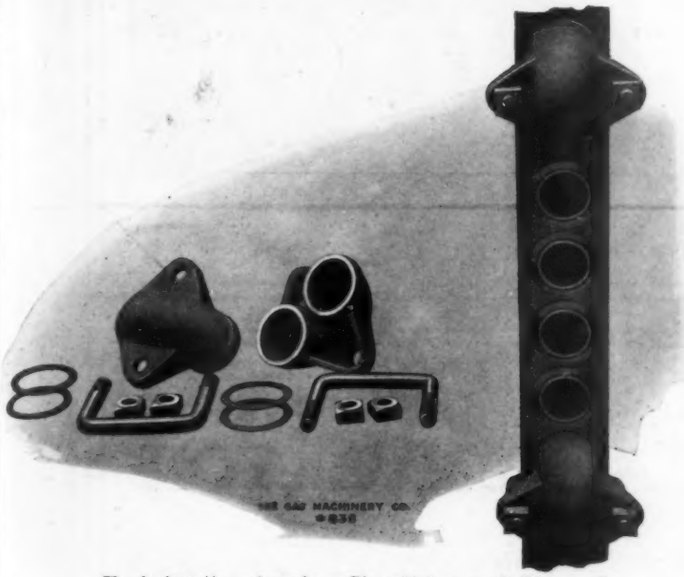
GAS OVENS

View to right shows Top of Oven Battery

This view shows the Pusher Side of Ovens

The Gas Machinery Com

ts - Special Machinery



End details, showing Simplicity and Strength

COOLING COILS

With 2-inch Tubes

Patent Pending

We also Design and Manufacture:

BENCHES,
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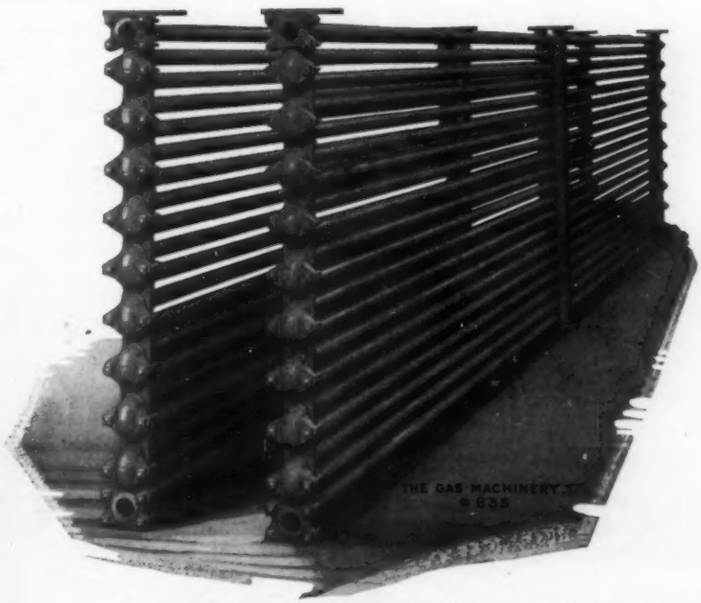
PURIFIERS,
AMMONIA CONCENTRATORS,
TAR EXTRACTORS,
VALVES AND CONNECTIONS,
WASHERS



Assembled Coils—Full area of pipe in bends.
Built 20 to 40 Tubes high.

mpany Cleveland, Ohio.

28-3
Atlantic City Gas Co., Atlantic City, N. J., operated by The C. H. Geist Co. Installation 9 ft. x 30 ft. Smoot Steam Accumulator. The U. G. I. Contracting Co., Engineers.

28-4
Hudson Valley Coke & Products Co., Troy, N. Y., installation of 9 ft. x 30 ft. Smoot Steam Accumulator. Semet-Solvay Engineering Corp., Engineers.

SMOOT STEAM ACCUMULATOR

Recent Installations of the
Smoot Steam Accumulator and Control System

Pittsfield Coal Gas Co., Pittsfield, Mass.
Semet-Solvay Engineering Corp., Engineers

Consumers Power Co., Pontiac, Mich.

Cedar Rapids Gas Co., Cedar Rapids, Iowa
The Western Gas Construction Co., Engineers

Georgia Power Co., Atlanta, Georgia
The U. G. I. Contracting Co., Engineers

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SMOOT ENGINEERING CORPORATION
136 Liberty Street **New York**

SMOOT CONTROL

U. G. I.

STANDS FOR AND SQUARELY BEHIND CERTAIN THINGS

viz:-

UNITED in its cooperative effort to give its clients and customers the best engineering, technical advice and materials possible, in order to produce the greatest value per customer-dollar expended.

GAS The mainstay of American household comfort. Our technical and business staffs are without superiors in their knowledge of and application to this fundamental industry. They are at your service.

IMPROVEMENT This has been the watchword and the aim of our organization since its inception. The results are so well known and far reaching that they are common knowledge. The improvements worked out by our staff mean betterments for you.

THE U. G. I. CONTRACTING COMPANY

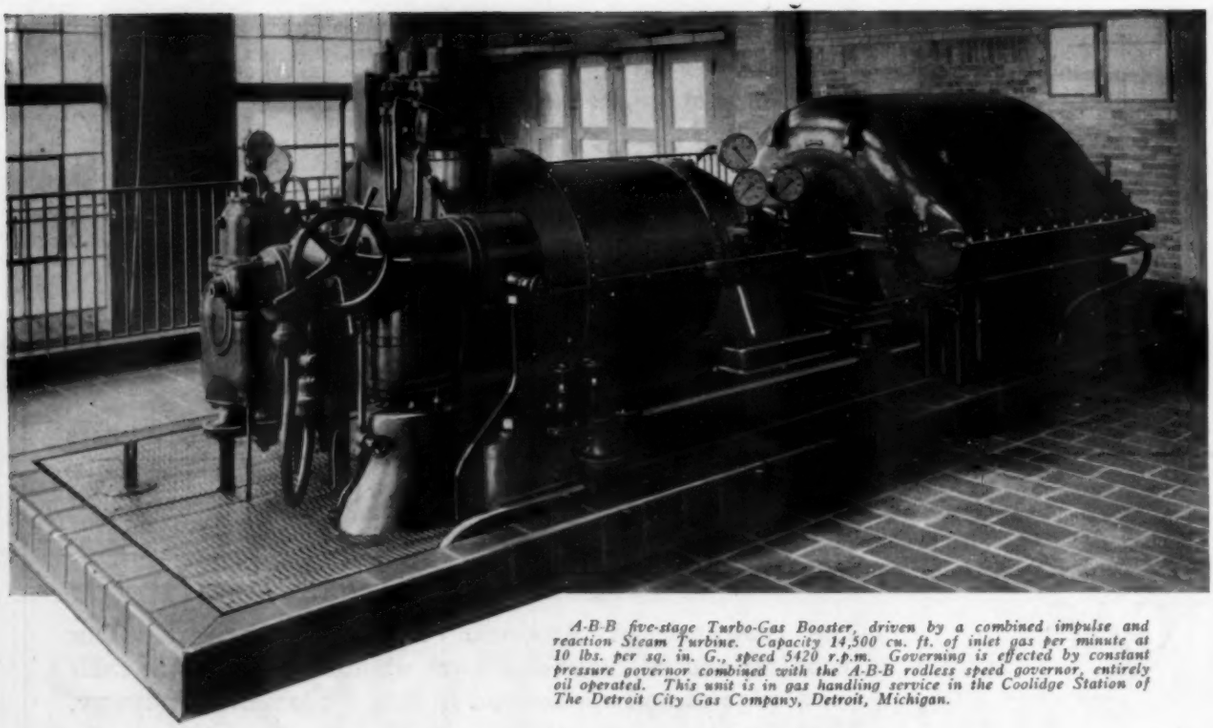
DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS INC.
Dwight P. Robinson, Pres.

Principal Office—PHILADELPHIA

CHICAGO ATLANTA

UNITED FOR GAS INDUSTRY IMPROVEMENT



A-B-B five-stage Turbo-Gas Booster, driven by a combined impulse and reaction Steam Turbine. Capacity 14,500 cu. ft. of inlet gas per minute at 10 lbs. per sq. in. G., speed 5420 r.p.m. Governing is effected by constant pressure governor combined with the A-B-B rodless speed governor, entirely oil operated. This unit is in gas handling service in the Coolidge Station of The Detroit City Gas Company, Detroit, Michigan.

A-B-B Turbo-Gas-Booster

proves highly economical

THIS A-B-B gas boosting unit, in operation for many months in Detroit, has been giving steady returns on the initial investment through its low steam consumption.

The high overall efficiency is obtained by utilizing the combined impulse and reaction turbine in combination with a turbo-blower having backward-flow blading and bladed diffusers.

A-B-B Gas Exhausters and Boosters are available for all classes of gas handling, for drive by steam turbine or electric motor, and for all capacities. Constant pressure or constant suction governing may be applied, whatever the driving unit.

Some of the largest turbo-blower units now operating in this country were supplied by American Brown Boveri. A-B-B turbo-blowers embody design and manufacturing features resulting from over twenty years' experience with this type of machine.

Our engineers are glad to assist in selecting the unit most suitable for your particular problem.

AMERICAN BROWN BOVERI ELECTRIC CORPORATION

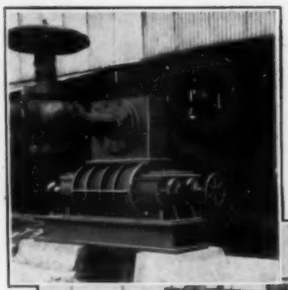
Main Plant **Camden, N. J.**

Gas-Boosters and Exhausters for Natural and Manufactured Gas
Turbo-Blowers and Compressors
Coke-Oven Gas Turbo-Boosters and Exhausters
Scavenging and Supercharging Blowers
Steam Turbo-Generator Sets
Mercury-Arc Power Rectifiers.
Transformers
High Voltage Oil Circuit Breakers
Electric Locomotives
Diesel Electric Locomotives
Automatic Voltage Regulators

AMERICAN BROWN BOVERI

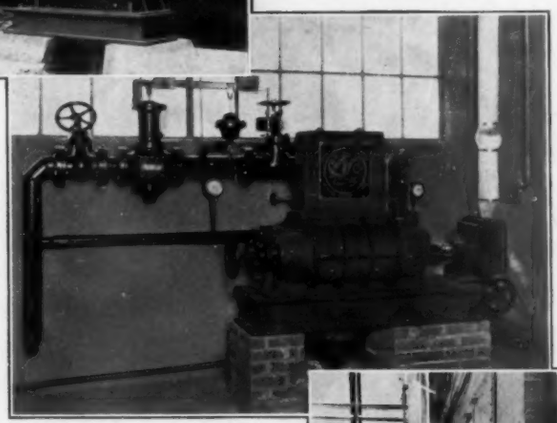
Connersville Meters

are giving dependable readings on industrial and commercial installations

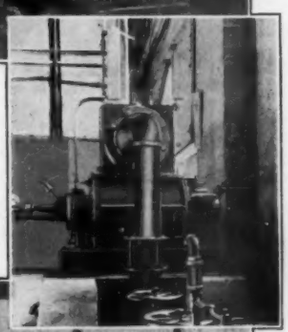


Connersville Meter measuring gas in a steel mill at Birmingham, Alabama. Normal load 20,000 to 40,000 cu. ft. per hour.

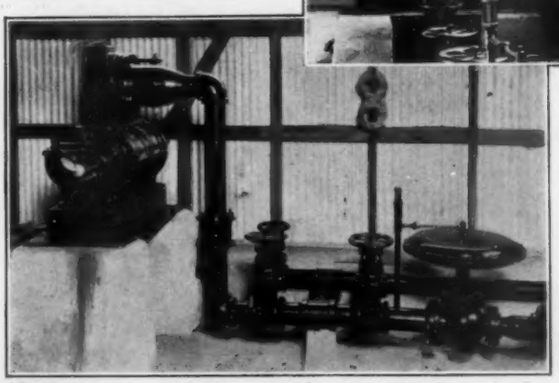
Connersville Meter, installed by Consumers Power Company to meter gas to the Motor Wheel Corporation, Lansing, Michigan.



A 15,000 cu. ft. per hr. Connersville Meter measuring gas to boilers in the natural gas fields.



Another smaller Connersville Meter registering the natural gas consumed under the boilers of a laundry at San Antonio, Texas.



The values that are found in Connersville Meters have already led many gas engineers to recommend the use of them on industrial and commercial installations, in steel mills, metal working factories, in bakeries and other food product plants, on heating installations, etc. These men have found that—

Connersville Meters are accurate, for the displacement is a fixed unchangeable volume.

They are dependable, for all parts are sturdily made from iron or steel, and are not subject to variation.

They are easy to install, a single meter, with its one inlet and one outlet connection can be installed, even for the larger consumers.

They are easy to read, the counter being mounted at a convenient angle, and containing a single set of figures giving a direct reading in cubic feet.

They are easy to maintain in service, as there are no delicate parts to require frequent adjustment.

Bulletin 4D illustrates the reasons for the dependable service of Connersville Meters. It is a new, revised bulletin. Ask for your copy of it.

The Connersville Blower Co.

12th St. & Columbia Ave.,

Connersville, Indiana

53 W. Jackson Blvd., Chicago, Illinois.

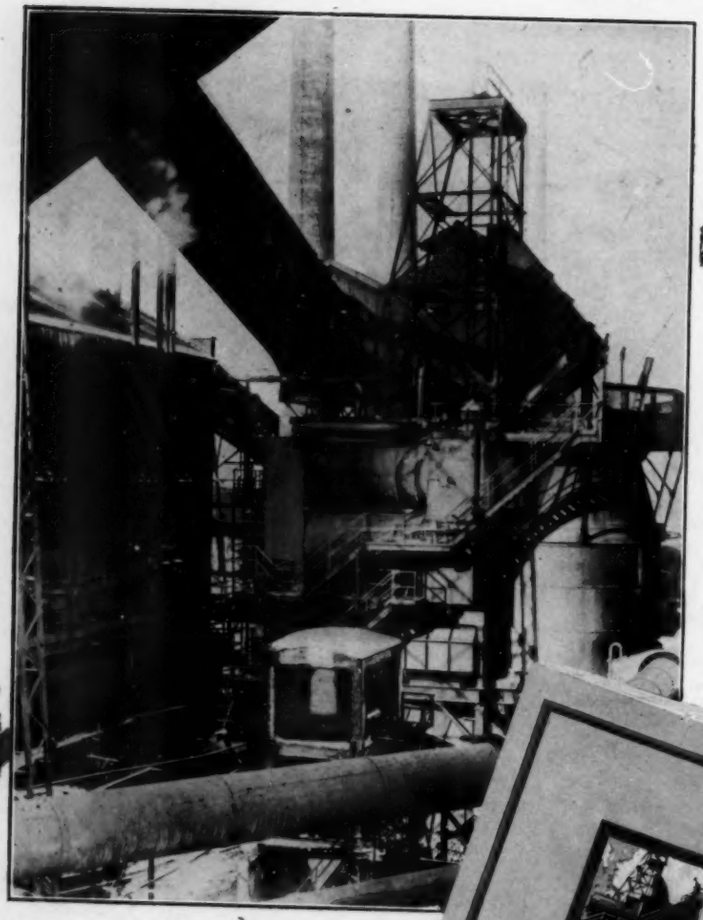
114 Liberty St., New York City

Chamber of Commerce Bldg., Pittsburgh, Pa.

250 Stuart St., Boston, Mass.

CONNERSVILLE

Blowers • Gas Pumps • Meters • Cycloidal Pumps



THIS 32-page booklet not only describes and illustrates the Sulzer System, but is a valuable treatise on the subject of coke quenching. It is replete with data and interesting information on the results secured in existing dry quenching plants.

A copy will be sent upon request.

DRY QUENCHING

INTERNATIONAL COMBUSTION BLDG.
A SUBSIDIARY OF INTERNATIONAL

Sulzer System

Dry Quenching of Coke

The DRY Platform Wins!!

We declare for Dry Quenched Coke:

Because the heat of the hot coke is reclaimed and utilized for steam generation.

Because the Percentage of moisture in Dry Quenched Coke is low, uniform and controllable, thus reducing fuel consumption. If desired an absolutely dry coke can be produced.

Because there is no water to furnish, pump and dispose of.

Because Dry Quenching of Coke eliminates maintenance to steel work due to vapors arising in the wet quenching process.

Because no water is used in Dry Quenching—hence there is no freezing.

The Sulzer System for Dry Quenching Coke is simple and dependable. The hot coke is put in a special sealed quenching chamber. Inert gases are circulated in a closed cycle, by means of a fan, through the hot coke mass, where they absorb the sensible heat of the hot coke and this heat is transferred to the water in the boiler circulation and converted into steam.

EQUIPMENT CORP.

200 MADISON AVE., NEW YORK, N.Y.

COMBUSTION ENGINEERING CORPORATION

STURDY
CONSTRUCTION PAYS

A Gas Holder Is A Sturdy Structure

TWICE
our
Porto Rico Holders
and
Miami, Fla., Holders
Were In the Path of the Hurricane

Much damage elsewhere

None to the Holders!

INTEGRITY
FAIR **C-K CO** DEALING
SERVICE

CRUSE-KEMPER CO.
AMBLER, PA.
ENGINEERS & CONTRACTORS
BUILDERS OF STURDY GAS HOLDERS
PURIFIERS, SCRUBBERS, CONDENSERS, TANKS, ETC.

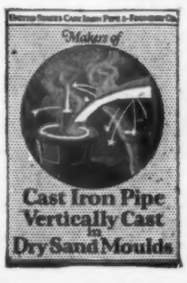
Eight-inch Anthony Joint deLavaud gas pipe line suspended on bridge across Colorado River at Austin, Texas

To reduce installation costs Anthony joint pipe is available in 24-ft. lengths made up of two standard lengths welded and tested under ideal conditions at our plant

No leaks occur in *this* bridge crossing

EACH year there is added proof of the soundness of deLavaud cast iron pipe with the Anthony joint for gas and water service. The Austin Gas Co. installed the 8 in. deLavaud main illustrated above in 1926. Where this line crosses the Colorado River Bridge, conditions are unusually severe, due to peculiar strain and constant vibration. That leakage has never developed is practical evidence of the great tensile strength of deLavaud pipe and the flexibility of the Anthony joint.

In modern high-pressure gas lines this type of installation has proved widely satisfactory. Under daily pressures of 90 to 125 lbs. leakage can be practically eliminated. DeLavaud pipe gives pressure-proof tightness, combined with ease of installation, and the age-defying economy of good cast iron.



MAY WE SEND YOU LITERATURE COVERING USES and LATEST SPECIFICATIONS OF DeLAVAUD CENTRIFUGAL PIPE

United States Cast Iron Pipe and Foundry Company

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American Hard Wall Plaster Co.
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New York, Rochester,
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Wm. Summerhays & Son
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American Hard Wall Plaster Co.
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Paragon Plaster Co.
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Odell Mill Supply Co.
Ohio, Cincinnati,
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Cleveland Tool & Supply Co.
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Westwater Supply Co.
Ohio, Dayton,
Klinger-Dills Co.
Ohio, Toledo,
The Builders & Industrial Supply Co.
Oklahoma, Tulsa,
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Texas, Corpus Christi,
San Antonio Machine & Supply Co.
Texas, Dallas,
The Murray Co.
Texas, El Paso,
Geo. B. Thomson Co.
Texas, Houston,
Norvell-Wilder Hardware Co.
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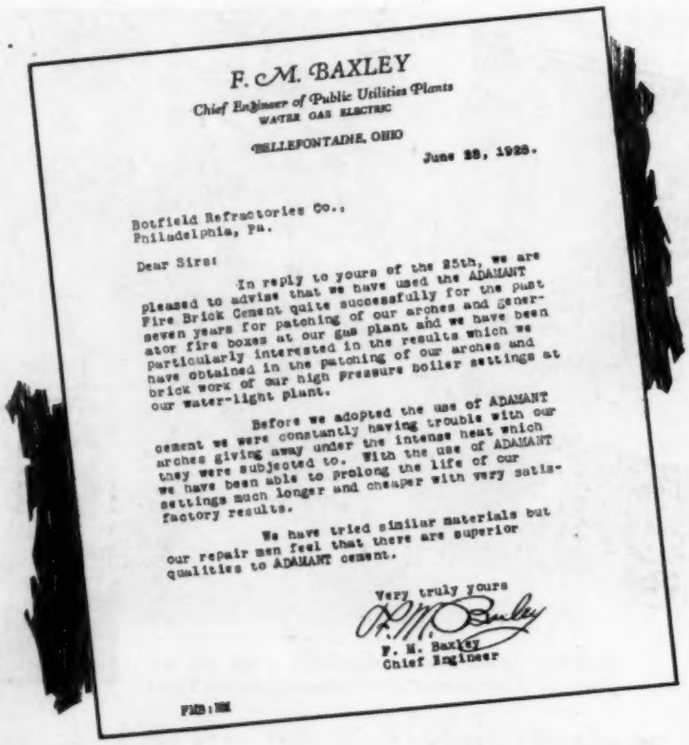

F. M. BAXLEY
Chief Engineer of Public Utilities Plants
WATER GAS ELECTRIC
BELLEFONTAINE, OHIO

June 25, 1928.

Botfield Refractories Co.,
Philadelphia, Pa.

Dear Sirs:

In reply to yours of the 25th, we are pleased to advise that we have used the ADAMANT Fire Brick Cement quite successfully for the past seven years for patching of our arches and generator fire boxes at our gas plant and we have been particularly interested in the results which we have obtained in the patching of our arches and brick work of our high pressure boiler settings at our water-light plant.

Before we adopted the use of ADAMANT cement we were constantly having trouble with our arches giving away under the intense heat which they were subjected to. With the use of ADAMANT we have been able to prolong the life of our settings much longer and cheaper with very satisfactory results.

We have tried similar materials but our repair men feel that there are superior qualities to ADAMANT cement.

Very truly yours
F. M. Baxley
F. M. Baxley
Chief Engineer

FMB:HK

Can You Say As Much?

INDICATING the satisfaction that ADAMANT Fire Brick Cement invariably renders in the gas plant is the letter reproduced above.

This instance of longer refractories service and lowered maintenance costs is not unusual. It has been duplicated in many other gas plants where ADAMANT Fire Brick Cement has replaced other bonding materials.

Ideal as a bond for fire brick, ADAMANT is equally efficient as a surfacing or facing material and as a binder in preparing patching mixtures.

For particularly severe conditions—where ordinary refractories are unsuited, in generator linings and other refractory construction—the Super-Refractory Mixtures of ADAMANT-ADACHROME *Fines* (for laying up fire brick), and ADAMANT-ADACHROME (for surfacing and patching) are recommended.

Interesting booklets and complete data are available to every gas plant official. Write us today.

Refractory coatings, applied frequently on generator linings and boiler settings by means of The ADAMANT GUN. (Price $25.00) Protect the refractories from destructive actions and add greatly to brickwork life.

BOTFIELD REFRACTORIES CO.
Swanson and Clymer Streets
PHILADELPHIA, PA.

For a Long Furnace Run, Use The ADAMANT *Gun*

ADAMANT
FIRE BRICK CEMENT

Whenever You Use a Fire Brick, Use ADAMANT, *the Original High Temperature Cement*

Well F-2 of large producing company in West Texas field catches fire.

Speed in pipe installation leads to choice of Victaulic Couplings for the water and steam lines.

Behind heat shields the Victaulic coupled lines are pushed in range of the burning wells and the fire is quickly put out.

12" oil pipe line equipped with Victaulic Couplings

"For every joint on the line"

VICTAULIC COUPLINGS

For temporary and permanent lines Victaulic Couplings are in a class by themselves.

They can be installed faster and at less cost than any other type of joint.

Unskilled labor can do all the work—a wrench is the only tool used.

The coupling is leak-proof for low or high pressure as soon as two bolts are pulled up tight.

Victaulic Couplings provide a flexible joint which does not leak when the line is shifted sideways or sags.

Victaulic Couplings make special expansion joints or expansion bends unnecessary because each Victaulic Coupling takes care of contraction and expansion of the pipe lengths it connects.

Victaulic Couplings make permanently leak-proof joints which require no maintenance work and will outlast the pipe they connect.

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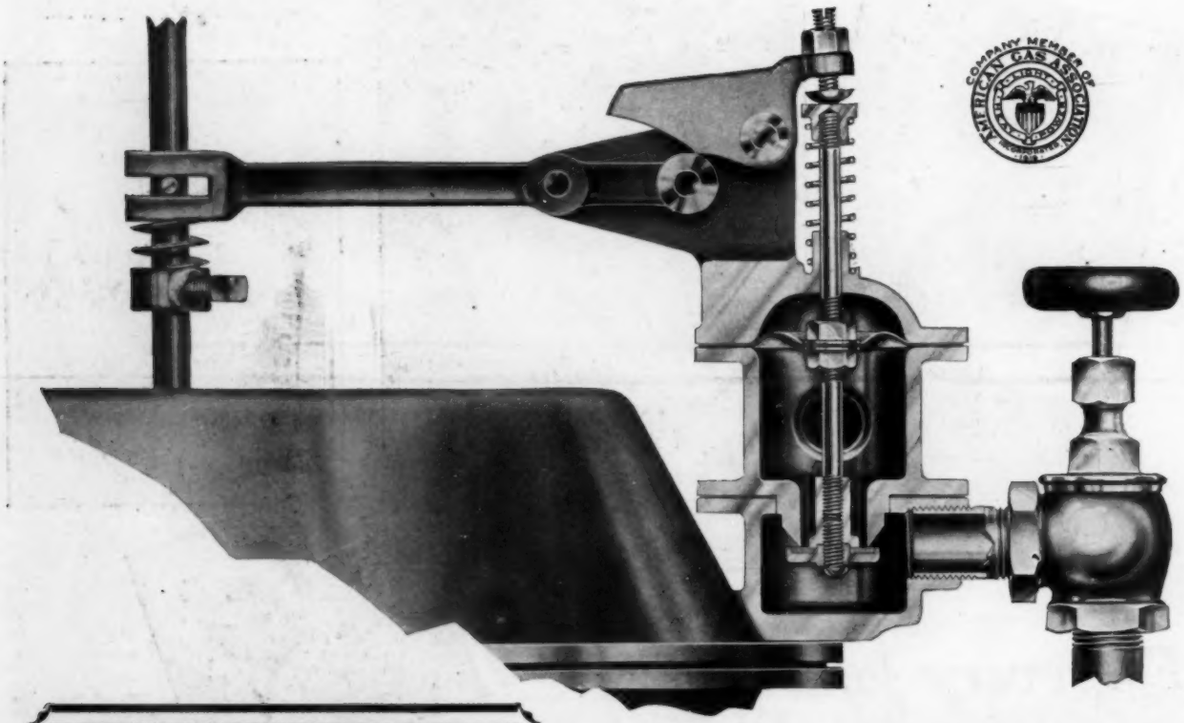

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One that may be easily installed on any of the thousands of Reynolds District Regulators now in use. One that has been proven in actual operation and ready for the trade.

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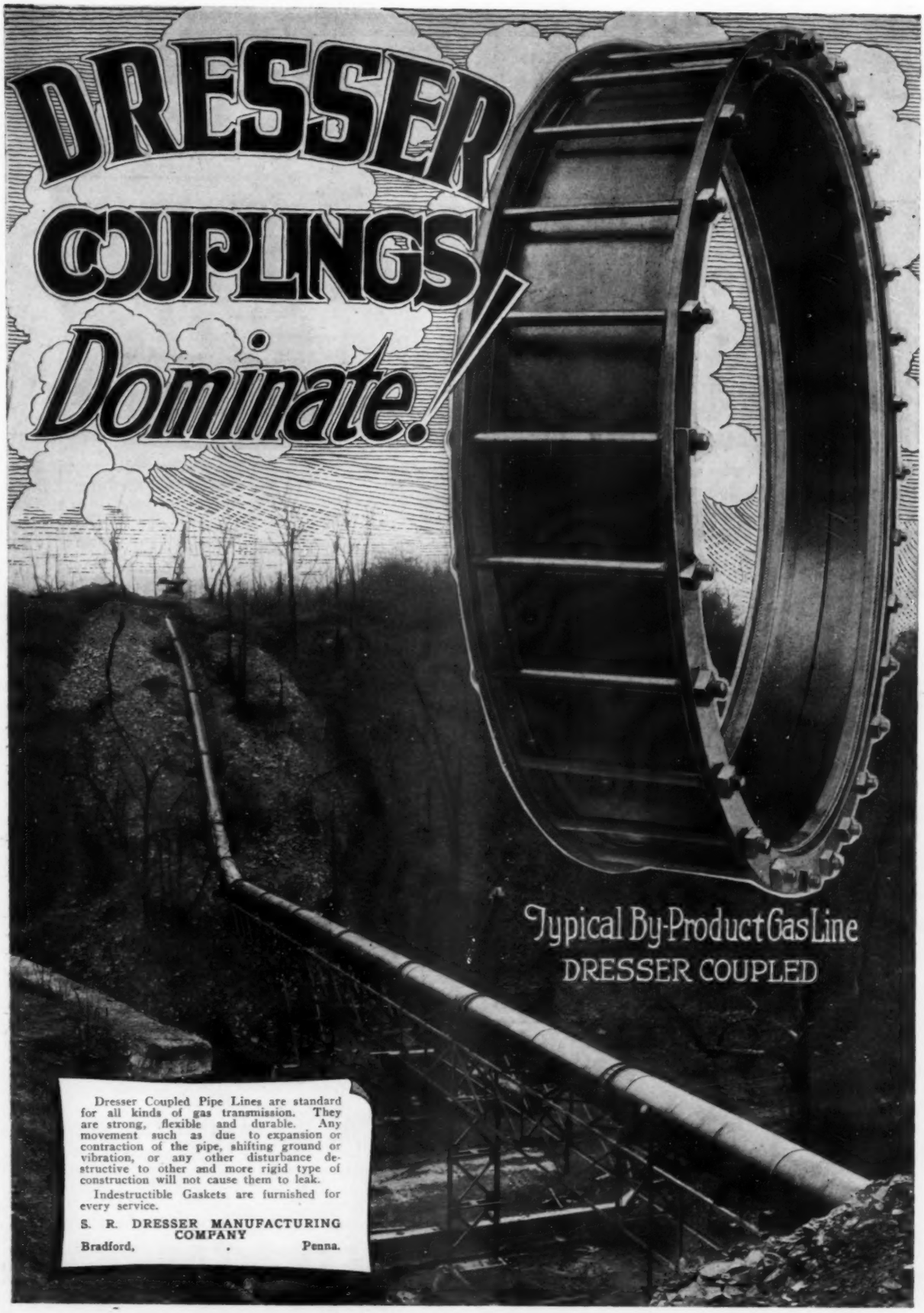

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The results obtained through the application of The Adams Patented Process and Chutes to the handling of coke and coal in one of the leading gas companies are comprehensively described under "General Discussion" in the report of The Carbonization Committee of the A.G.A. made at the Atlantic City Convention last month.

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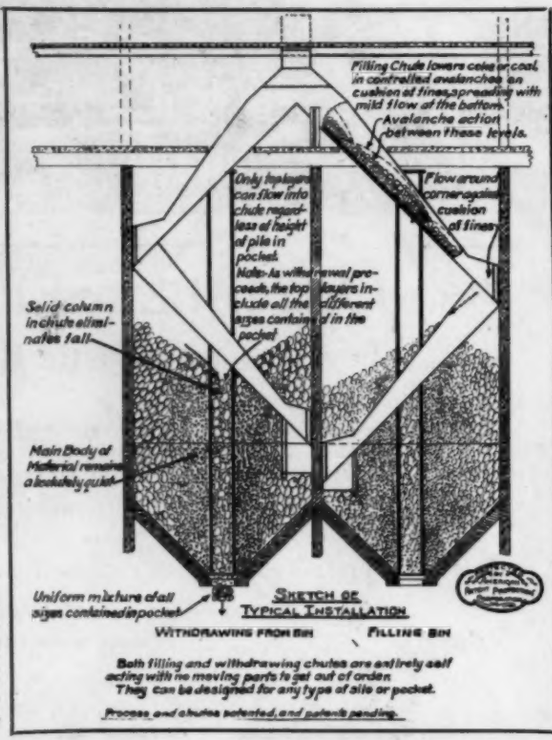
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Avalanche action between these levels.
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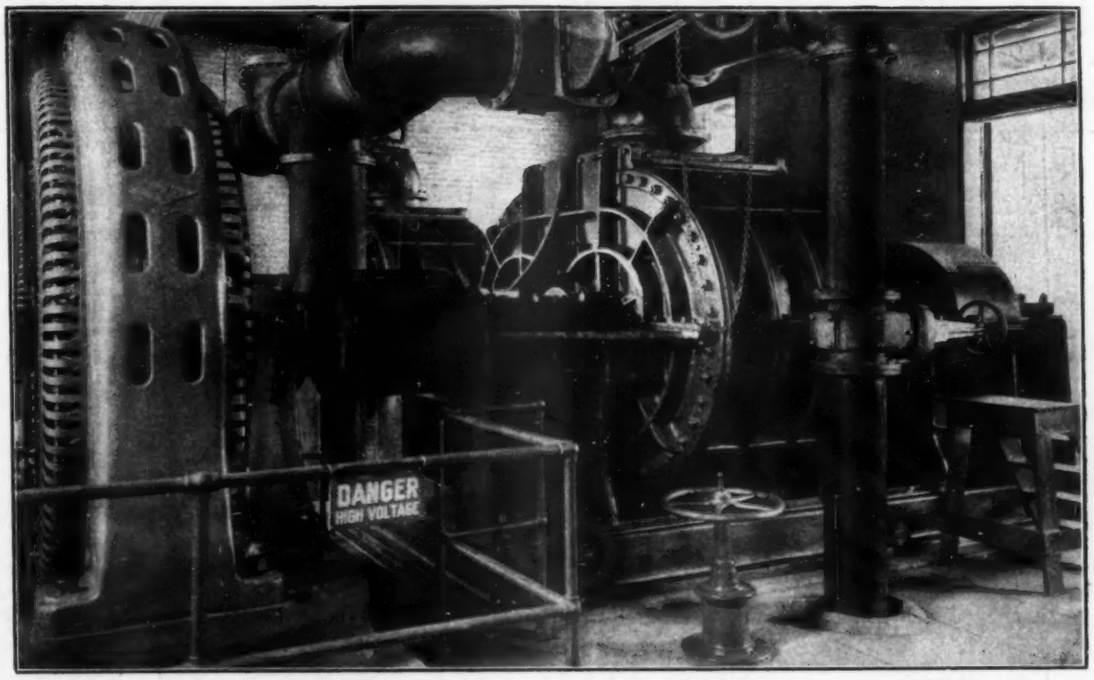

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View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, *Editor*

"Pepping-up" the Industry

EVEN IN the dim past humans undoubtedly gathered together at regular intervals to discuss and cogitate, anent divers matters concerning their immediate welfare. Thus, it requires but scant stretching of one's imagination to fancy our hairy-chinned ancestors of the Stone Age heatedly mulling over the best method for keeping their person as remote as possible from the gouging tusks of the Mammoth or better still, passing upon the most succulent suggestion for grilling a steak unceremoniously peeled from the flank of an objecting Cave Bear.

OUR OWN Gas Industry, following the convention fashion set in those far-off ages, meets once a year for peculiarly similar reasons. For, reducing the matter to its elements, we are primarily interested in making and distributing gas to the end that our fellow humans will acquire the desired pleasure in living, both as regards its effects on the outside as well as the inside of their bodies.

ASIDE FROM the all-important necessity of formulating and discussing the proper ways and means of better conducting our Industry—better serving the public—we should not lose sight of the fact that our conventions also serve the excellent purpose of increasing our own esprit de corps. Without such enthusiasm our plans would be consummated very ineffectively.

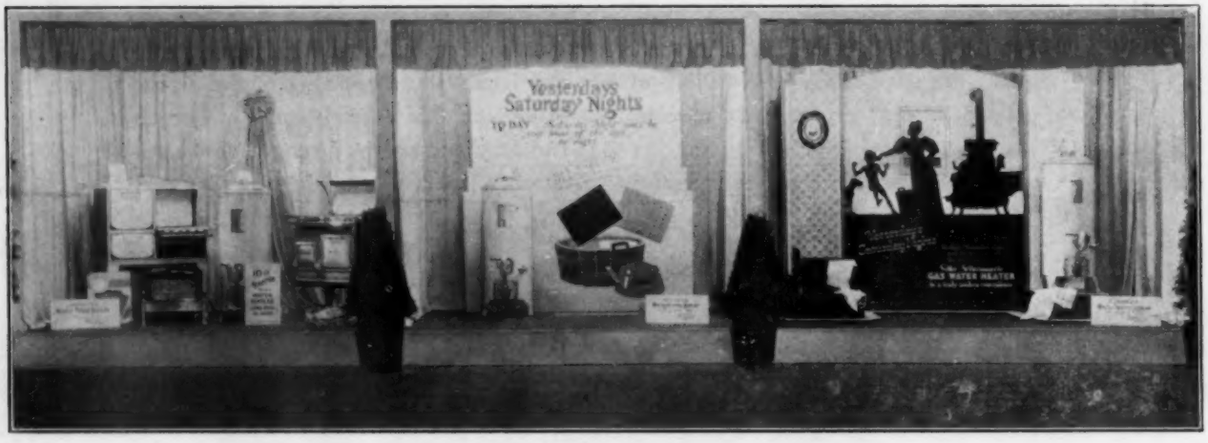
THE GAS INDUSTRY is to be congratulated that its Annual Convention goes further than the bare handling of fact and formula and partakes of the nature of a "pepping-up" process. Of a verity, the American Gas Association Convention is essentially New Year's Day for the Gas Industry and on the strength of the enthusiasm shown at the recent meeting in Atlantic City, one can safely predict that its members enter their best year, with a united front and banners flying.

Window Display Exhibits at the Atlantic City, A. G. A. Convention Set a High Mark of Excellence

Below—If you are of the type that likes to burden your window with an irritating conglomeration of items, take your cue from this crazy-quilt window trim. Such efforts only add to the chagrin and befuddlement of the window gazer and most assuredly WILL NOT assist materially in the sale of your wares. By all means do not drift into the rut of imitating "two by four" hardware store window trimming.

Above—This pert looking guardsman with his gaily colored uniform and radiant breastplate reflects careful and effective thought on the part of the Window Trim Committee. Moreover, if such an arrangement were carried out by the local gas company it could not help but bring prospects into the store. And, for the relatively low cost of less than one hundred dollars, an exact duplicate or something equally effective can be executed. Window display men should profit by the vigorous work being done for them by their committee.

Below—One of the window display panoramas shown at the Convention. Note the splendid section at the right. It carries the human interest appeal in the highest possible manner. Do not be timid in injecting a bit of humor in your window trim now and then. Properly handled it will pay worth-while dividends. Attention is also called to the rugged but appealing art work in this as well as the middle section.



From the Journal's Viewpoint

In Which the Editorial Staff Comments on the American Gas Association Convention

Part 1—General and Exhibits

In this recountal of some of the happenings and high lights of the recent Convention of the American Gas Association at Atlantic City we have endeavored to present certain features in a manner most easily digested by the reader. Further, we have, at some points, made editorial comment on such features. In addition to these matters reference should be made to the able address of Bernard J. Mullaney on the Laboratory Approval Seal, the really excellent study and compilation of statistics as presented at the meeting of the Accounting Section by Paul Ryan, Statistician, American Gas Association, and a number of other outstanding phases of this most successful meeting ever held by American gas men.—Editor.

THE average outsider viewing the Convention as a whole might be pardoned in speculating as follows: "This is undeniably a very large gathering of men from all parts of the country; further, the various addresses, papers and committee reports cover a vast amount of work carried on by the gas industry and lastly, the variety and number of exhibits together with other incidentals represent no inconsiderable expenditure of time and money. It follows then as to whether the results and benefits that accrue justify all of the foregoing activities which were part and parcel of the Convention."

It is the whole-hearted opinion of the *American Gas Journal* that the good that will be derived from this greatest Convention of gas men ever held in this country far outweighs and amply compensates for any expenditure of time and money that was made. We are also certain that every gas man in attendance carried back home ideas and inspirations that will be of immediate benefit to his company as well as himself.

In looking back over the program it is quite evident that the vital needs and hopes of the Industry were handled and discussed in a manner perhaps never before approached by any previous convention.

President Fogg's Address

We hold that the Gas Industry of today has definitely emerged from the rule-of-thumb stage and has entered an era of mathematical exactness. Accordingly, it has no place for those individuals who are merely content to drift along with the tide. Such men will increasingly learn this condition but those who are of a mind to apply themselves to the manifold problems of the Industry will most assuredly reap a worthwhile reward that will measure up to their entire desires. President Fogg in his address sounds the need for ascertaining the "exact facts relative to all phases of our industry's operations and their application to the problems of the future."

Research is in the saddle and President Fogg succintly defines its meaning to the gas man when he says:

"To many minds the word 'research' is confined to technical matters. We do not thus limit it. The demand for ascertainment of exact and pertinent facts is just as insistent from those more directly concerned with the marketing of our product as it is from those who seek more economical and efficient methods of production and distribution."

From the large number of very able and pertinent addresses delivered we have selected for printing that of Arthur D. Little as being especially inspiring.

Research—And A Greater Gas Industry

By Arthur D. Little

Electricity has established itself in the popular mind as an agency from which anything may be expected. The public, long familiar with electric light and power in almost innumerable applications, now accepts the telephone, the electric refrigerator, radio, television, and all the rest as normal products of the Electrical Age in which it is pleased to think it lives. It is ready to accept the next new marvel without batting an eyelash. It backs its confidence with its money. It has put nearly $9,000,000,000 into electric light and power. That is double its investment in natural and manufactured gas.

Now the electrical industries in all their amazing ramifications are the direct product of unremitting research. One company making electrical equipment appropriates more than a million dollars annually for the support of its research laboratory. The American Telephone and Telegraph Company spends for research alone, as contrasted with development, more than twelve times that sum and the total for the industry is a gigantic one.

Meanwhile the gas industry has been wedded to tradition. It has lost its grip on the popular fancy, or, as Robert R. Updegraff puts it:

"One of your industry's troubles is that the public has practically run out of imagination about gas. It

doesn't expect anything more of it." And he goes on to say:

"Let the gas industry build up in the public mind an expectation of gas progress through the magic of modern chemistry and you will be in the stream of popular interest. . . . Having caused the public to expect great things of the gas industry, you will be obliged to deliver."

Billions Needed

Now you are going to need several billion dollars of new capital within the next ten years and you must get it from the public. Isn't it well worth your while to spend one tenth of one per cent of your present investmnt of $4,350,000,000 to uncover and initiate developments which shall so impress the investing public with their possibilities that these new billions will be forthcoming?

The public is quite as ready to accept new marvels from chemistry as it is from electricity and, what is still better, chemistry is quite as competent as its sister science to make deliveries. This being so, it is obviously to your great advantage to lose no time in definitely tying chemistry into the gas industry.

It should not be difficult for you to do this for chemists have, in recent years, been giving much attention to matters which have a very direct bearing on the future of your business, and which promise developments of highly important and revolutionary character. In your interest I cannot better utilize the time allotted to me than by pointing out the nature and bearing of some of these more recent products of research.

As a background for the picture let us first consider briefly a few of those more obvious things that justify your expectation that the gas industry is entering upon a period of great expansion, for during that expansion you are certain to be confronted with many serious problems which only research can solve.

You look forward with assurance to a vastly augmented demand for gas for house heating. That brings up at once the problem of your summer load. Chemistry, working outside your industry, has already furnished you with the gas-fired refrigerator, which, in its ultimate form, should hold the field against its electric competitor. That will furnish a part, but a relatively small part of the summer load you need. A proportion many times greater is within your reach through the extension of the principle of the gas-fired refrigerator to the space cooling of homes, offices, and factories.

Motor Fuel Production

Most suggestive of all, however, in its relation to your summer load, is the possibility of developing, through research, methods by which the gas industry will be definitely tied in with the production of motor fuel. My own laboratory has demonstrated one such method by which, through the vapor-phase cracking of gas oil, there is obtained 1200 cu. ft. of 1500 B.t.u. gas for enrichment use, together with 12 to 14 gals. of crude motor spirit, 4 gals. of 24°Beaume fuel oil, and 14 to 16 gals. of cycle stock per barrel throughout of oil.

In Germany Dr. Fischer has recently succeeded in synthesizing from water gas the whole series of paraffin hydrocarbons from methane to solid paraffin. His process is still in the laboratory stage, but obviously any commercial development of it would permit the diversion of your water gas in summer to the production of motor fuel.

Of more immediate interest, although without bearing on your summer load, is the demonstration of the fact that the Bergius process for the liquefaction of coal can also be applied to the production, from coal tar, of light oils and motor spirit by hydrogenation under pressure.

In addition to house heating, with its problem of the summer load, you very reasonably anticipate a great expansion in the industrial use of gas. In its publication, *Industrial Gas Heat,* your Association has stressed the manifest advantages of gas as the heating agent in many industrial operations. The long list given there of operations in which gas has demonstrated its superiority ranges from ceramic firing, the annealing of metals, japanning and die making through baking, coffee roasting, and candy making down to the singeing of hogs. The last is more interesting than it sounds for Chicago already uses about 50,000,000 cu. ft. of gas a month for this one purpose.

There are unquestionably in the industries of our country thousand of other opportunities for the advantageous use of fuel gas, but if you are to avail yourselves of them to your profit much research must be directed to the solution of the heating problems of the specific industries. To cite only one example, what consideration have you given to the many operations in the chemical industries in which a properly designed system of submerged combustion would operate to great advantage and economy?

Gas—A Chemical Raw Material

Important and promising as the developments immediately before you are, you must prepare yourselves for others more remote from your tradition and experience but equally significant. Whereas you have been accustomed to think of gas merely as fuel of the highest form value, you must now learn to regard it as a chemical raw material with extraordinary possibilities for profitable development. You must decide whether you are to be content, as you have been in case of coal tar, with the very moderate returns obtainable from the sale of raw material as such or whether you will yourselves convert your gas into products of a new order of value.

It has, recently, been said, "Few industries of the magnitude of the gas industry know so little about their raw material," meaning of course, coal, and to this statement might be added—few industries have given so little attention to the higher uses of their products.

There are already apparent, but in other hands than yours, the beginnings of a great chemical industry based on natural gas. Among its present products, which are but the forerunners of many others, are:

Ethylene dichloride and ethyl chlorhydrin, both valuable solvents and intermediates.

Ethylene glycol, a substitute for glycerine and an ideal anti-freeze compound for automobiles.

Amyl chloride, amyl alcohols, and amyl acetates, the last being one of the preferred solvents for nitrocellulose in lacquers and finishes.

From methane, as Bergius has recently shown, hydrogen and carbon dioxide are readily derived. Natural gas is thereby in position to be directly linked up with the liquefaction of coal, the synthesis of ammonia, and the production of solid carbon dioxide, the so-called "Dry Ice."

Before those of you who manufacture water gas even broader opportunities are opening. I have referred to

Fischer's work in synthesizing gaseous, liquid, and solid hydrocarbons from water gas. From the same material General Patart, in France, has produced by catalytic processes, various alcohols, numerous organic acids including acetic acid, acetone and its related compounds, as well as a large number of other organic products, many of which have a recognized place in industry. Of these methanol or wood alcohol and formaldehyde, produced from water gas, are already upon the market in quantity. With such leads as these properly developed through research the gas works of the future should be the heart of a great and varied chemical industry.

Eliminating a Handicap

You have, moreover, in water gas the potential means of freeing the distributors of manufactured gas from what is perhaps their most serious handicap, namely the asphyxiating and poisonous character of such gas as now distributed. I need not go into statistics of the fatalities resulting from this cause. The situation is well appreciated by all of you. I do, however, invite your serious consideration of the possibility of remedying it through the conversion of water gas to methane.

Methane, CH_4, is the first of the paraffin series. It is colorless and odorless. It has no physiological effect upon warm-blooded animals. Its explosive range in air is between 6 and 13% as compared with 6 to 38% for an average city gas of 525 B.t.u.

Methane has a density of 0.56, or only a trifle higher than that of water gas. Its calorific value, steam condensed, is about 1000 B.t.u. per cu. ft. as compared with the customary standard of 525 B.t.u., or with 300 B.t.u. for blue water gas. Its general properties and requirements in use are well understood since it commonly constitutes 80 to 90% of the vast quantity of natural gas delivered to consumers.

We have, then, in methane a non-poisonous gas of about twice the calorific value of manufactured gas as usually distributed. The chief advantage of a high B.t.u. gas over one of low B.t.u. content concerns the distribution system and the cost of distribution. The amount of energy that can be distributed in any gas system is proportional to the B.t.u. content of the gas distributed. If the capacity of mains, meters, holders, and the like has been carried to the limit in the direction of increased pressure, the only way that a further increase in the quantity of energy transported can be had is through raising the B.t.u. value of the gas. Anything, therefore, which, like methane, promises to double the energy-carrying capacity of your distribution systems obviously deserves serious consideration in anticipation of the greatly increased demand for gas which you foresee.

Assuming that the non-poisonous character and high energy value of methane make it a desirable substitute for the manufactured gas now distributed, we have still to consider what possibility there may be of placing its production upon a commercial basis within, say, the next ten years.

We owe to Sabatier and Senderens the initial demonstration that methane can be synthesized from either carbon monoxide and hydrogen or carbon dioxide and hydrogen through the agency of appropriate metallic catalysts at suitably controlled temperatures and at atmospheric pressure.

According to the commonly accepted reaction two volumes of carbon monoxide plus two volumes of hydrogen are, when thus treated, converted into one volume of methane and one volume of carbon dioxide. Since blue water gas commonly contains carbon monoxide and hydrogen in approximately equal volumes it closely conforms to the raw-material requirements of this reaction.

By another reaction the carbon dioxide resulting as a by-product of this first reaction may be converted into methane and water vapor, four volumes of hydrogen being required for each volume of dioxide.

When three volumes of hydrogen react with one volume of carbon monoxide the products are one volume of methane and one of water vapor.

The relative economy of these reactions, should they be applied in future practice, will thus presumably be determined by the cost at that time of hydrogen as compared with that of water gas.

Since vast volumes of hydrogen are required for the rapidly expanding production of synthetic ammonia, as well as for the Bergius process for the liquefaction of coal, we may reasonably assume that the intensive effort now directed toward its cheaper manufacture will ultimately result in lower costs for hydrogen.

At present several methods are commercially available. It may be separated from water gas by liquefaction, or made by passing water gas and steam over iron at 500° C., or by the cracking of waste refinery gases, or by passing steam alone over hot iron.

Since you already have in both coal gas and coke-oven gas 30% or more of methane and often about 50% of hydrogen, you have immediately at hand what would seem to be you most economical source of hydrogen. In Europe, hydrogen for the ammonia synthesis is in fact now prepared on the large scale from coke-oven gas by the Claude refrigeration method.

Of still greater promise for your purposes, however, are the possibilities presented by the direct catalytic treatment of mixtures of coal gas or coke-oven gas with water gas in such balanced proportions that the required hydrogen is present in proper ratio to the carbon monoxide for the production of methane. We are not aware that such studies have been undertaken.

Another Possibility

Another possibility of great significance to the gas industry presents itself in this connection. We have already pointed out that in the water gas and steam reaction for making hydrogen, carbon dioxide is formed in equal volume with the hydrogen. Similarly, when in the synthesis of methane from water gas the carbon monoxide and hydrogen are present in equal volumes in the initial gas, the completed reaction delivers equal volumes of the carbon dioxide and methane.

Recently, as you are well aware, solid carbon dioxide has been proved to afford a very economical and efficient means for cooling refrigerator cars. It is similarly useful in the local distribution of such products as fish, ice cream, and confectionery, which can be frozen without damage. It can also be used for domestic refrigeration in very inexpensive equipment, where it has practically all the advantages of electric refrigeration without the high first cost of installation. It seems probable, therefore, that if the price of solid carbon dioxide, which is now selling at 5 to 10 cents a lb.,

could be reduced to 2 cents, an unlimited field for its use would be opened up. The gas company would then be a logical producer of the material and might be said to take over the distribution of both heat and cold commercially. A gas works of the size of that of Boston, operating on the methane cycle, would be able to produce about 500 tons of solid carbon dioxide daily, the equivalent of 1500 tons of ice. At 2 cents a lb., the sales value of 500 tons of dioxide would be $20,000, which must approximate the present daily revenue of the Boston company.

If further investigation and research should demonstrate that methane can be produced commercially at a cost permitting its general distribution, you may then not only furnish the consumer a non-poisonous gas, but one, which, by another step in advance, will require no primary air at the burner.

If you consider, briefly, with me the properties of a mixture of methane and oxygen containing 20% of oxygen you will, I believe, find justification for this conclusion.

In the first place it can, presumably, be breathed indefinitely without injury, since the only physiological effect of methane seems to be through dilution of oxygen. No householder could be either asphyxiated or poisoned by a wide open gas line in his home. Coal gas, on the other hand, may be poisonous when as little as 1% is present in the room.

We have, in one of our experiments, kept a mouse, of the very active variety known as dancing mice, for 19 hours in such an oxygen-methane mixture. After 6 hours he was still chasing his tail around with great speed and though somewhat lethargic from diminished oxygen supply at the end of the 19 hours, he regained full vigor and activity within a few minutes following his release.

You may be concerned with the danger of explosion, but I would remind you that the gasoline gas once widely used for lighting isolated homes carried on the average 18.5% of oxygen.

The inflammability limits of methane in oxygen at atmosphere pressure are 6 to 57% as compared with 5.5 to 14% in air. It seems certain that a mixture containing even 40% oxygen with 60% methane is not explosive, while a mixture containing 20% oxygen and 80% methane should be safe from explosion at all ordinary pressures.

Flame Temperature Higher

The flame temperature of such a mixture, reckoned from room temperature, is about 10% higher than that of the pure methane flame burning in air.

There is, of course, involved in this proposal the question of the cost of oxygen. The two methods now available for making oxygen cheaply are the electrolysis of water and the liquefaction of air. The latter method is now in extended use. By it oxygen can probably be produced today for not more than $12 a ton, equivalent to 50.4 cents per 1000 cu. ft. Estimates of future costs range from $5 to $8 a ton, the lower figure representing 21 cents per 1,000 cu. ft. These costs are so far within the presumable selling price of the mixture as to make the addition of oxygen economically sound.

In the case we are considering the electrolytic method has the important advantage of producing two volumes of hydrogen for each volume of oxygen, and for this hydrogen we have immediate use in the synthesis of methane.

Since both the electrolytic and the refrigeration methods of producing oxygen require a large expenditure of power they present opportunity for mutually advantageous cooperation between the gas company and the electric company by furnishing a load for the electrical generating capacity which is otherwise idle except during the periods of peak load.

The process of producing methane, together with carbon dioxide for "dry ice," is one of the simpler steps in a series of possible syntheses by which various hydrocarbons, alcohols, fatty acids, and other important chemicals can be produced from water gas. Once the methane synthesis is in commercial operation we may expect that the gas company will not stop at this single operation, but will actively develop further processes to yield motor fuel and special solvents.

Logical Objective

The logical objective of the manufactured gas industry is, therefore, that of constituting itself the agency through which the community is enabled to utilize coal in the most effective possible way. To this end it should ultimately process all coal, supplying factories, railroads, and utilities with smokeless fuel and distributing gas from super-gas works through high-pressure lines over wide areas for domestic and industrial heating, refrigeration, and space cooling. Its works should be the center of closely associated groups of chemical plants for the recovery of higher values from its tars and other by-products and for the utilization of water gas as raw material for motor spirit, alcohols, solvents, and a wide range of important organic chemicals.

That this prospect is likely to become an actuality much sooner than most of you realize is evidenced by the recent statement of the head of the Coal Utilization Company of Essen, in which he outlined its ambitious program as follows:

"Contrary to press statements that the new company is not concerned with the chemistry of coal, I must say here that its field is unlimited. All processes which use water, air and coal as raw materials belong to the activities of this company. Coal which is otherwise unsalable must be changed to other forms of energy or to other materials for which there is a market. It is natural that the new company cannot begin at once all the methods of work. Its activities will be divided into those which can be immediately applied and those which must be left for the future. In the first class belong the distant supply of gas, district heating, the application of coal distillation, gasification and firing of powdered coal. For the future there are those modern chemical processes which have coal for their raw material but which require further scientific study and which, before technical application is possible, must be submitted to extensive investigation."

Here in America the gas industry is at last awakening to the creative power of research and through its effective application may be expected to proceed to developments of astonishing diversity and magnitude.

Exhibits

Elimination of exhibits would undoubtedly detract greatly from the success of the A. G. A. Convention. This would reflect in a falling off of attendance and a lessening of personal contacts. All of these effects would shunt the convention into a very dry and academic channel.

The number and variety, as well as the artistic arrangement of exhibits at the recent convention furnished splendid evidence of the necessary aid the appliance and equipment manufacturers are giving the industry. From the coal pier in the plant to the cock on the appliance the manufacturer of equipment and appliances is in the van of furnishing the public with the best fuel.

Part II—Marketing of Gas

THOSE who were fortunate enough to have attended the meeting of the sections most generally concerned with selling gas must have been impressed with the comprehensiveness and logical arrangement of the program. Nothing of a superfluous nature was included in the main fabric of papers and committee reports and much that might have been deemed worthy of consideration is, after all, merely incidental.

Thus, considering the program presented at the sessions of the Commercial, Industrial, Home Service and Advertising Sections, we find a great fund of information which touches vitally upon the fuel we are selling, the men actually doing the selling, the appliances for its correct utilization, and the necessary advertising stimulus. The committee reports in particular are well worth a careful study on the part of those employees interested in these phases of gas company activities.

We are of the opinion that J. J. Burns' statement in his address,—"The goal of our efforts—increased domestic sales per meter, seems more readily attainable than ever before and seems dependent only on our ability to apply the necessary means to properly stimulate sales efforts and improve sales methods"—has a ready application in the Industrial Sales of gas as well as the Domestic.

Educating and Remunerating Salesmen

The successful marketing of any commodity or service is dependent for the most part on salesmen. Consequently it is imperative that such men be well grounded in the essentials of selling and have a good working knowledge of the goods to be sold. Further, these salesmen must be adequately compensated, to the end that their morale will be keyed to the desired pitch and turnover held to a minimum.

In discussing The American Gas Association's Training Course, which incidentally will soon be available, Mr. Howard Williams emphasized one point which should have a very stimulating effect. This had to do with his contention that gas salesmen, as an average, are on a par with salesmen in any other line of business, insofar as ability and results are concerned.

But, there is no royal road to successful salesmanship; the vocation and its underlying rules must be diligently studied and cultivated and we join with Mr. Williams in voicing such a sentiment. Those who are unwilling or dilatory in this regard owe it to themselves to seek employment in a different field. But, after all, success in any line of work requires constant study and application and the gas man would be wise in bearing in mind that successful salesmen do not just happen and do not merely drift to success on the strength of some inherent aptitude.

Dexter's Conclusions

Mr. H. E. Dexter, Chairman, Salesmen's Compensation Committee, comes to the following conclusions:

"Were the utility to pay a merchandising commission only, they could expect that the salesman would devote his entire effort only to the sale of high price merchandise and would not bother about any other operations of the company by which he is employed.

Some of the guests who attended the Home Service Directors' Luncheon.

We must remember, however, that the object of the sales department is to sell gas, thereby increasing the gross revenue received from the domestic customers. Recognizing the principle that the fundamental purpose of the sales and new business department is to increase the gross operating revenue for the utility, any system of compensation must be based upon the increased sale of gas caused by the use of any particular appliance. In setting the minimum standards for any such sales compensation plan, utility executives must bear in mind that the one tremendous difficulty in any business today is salesmanship.

"Our companies must sell their service and their company to its patrons and to do this successfully it must be done by a well-paid, well-trained, well-managed, sales organization."

It is generally agreed that the industry must hold its salesmen by paying them adequately. Such adequacy of remuneration, however, should include some intangibles which will accrue to the salesman's advantage over a reasonable period of years. Such intangibles are pensions, vacation and sick leave, greater likelihood of being retained on the payroll during slack periods, etc.

We feel that Commercial Managers should carefully study the report in question and arrive at a basis of pay for his company's salesmen that will be mutually fair and compare favorably with the income that such employees might obtain in some other business or industry. The salesman, too, should bear in mind that, at the same rate of pay, he is in a more secure position than if employed in a great many outside businesses. He should steer clear of high paying sales jobs that are transients. Further, he should never hesitate to discuss his rate of pay with his superior and in a frank and friendly manner and the latter should give careful heed to such discussion. Such mutuality of confidence will go far to reduce salesman turnover.

Gas Refrigeration

This newest and most intriguing application of gas opens a field of possibilities that demands immediate attention and study. Both the address of N. T. Sellman and the committee report on "Selling Gas Refrigeration" furnish undisputed evidence that gas refrigeration can be sold in thousands of homes. Further, such units can be sold against the hardest competition from electric refrigerators. The only impetus necessary to put refrigeration sales on a firm footing is for the particular gas company management to decide that they want such business and then train their salesmen to handle such sales. Selling gas refrigeration, in our opinion, is something that will stand no half-hearted, make-believe efforts.

One thought that might be derived from the Convention discussion on gas refrigeration is that gas companies should work with the manufacturers in the direction of eventually supplying the public with a lower priced unit, thereby greatly increasing the field of prospects.

House cooling should be actively investigated and followed out at once. Here would seem to be a great opportunity for our industry. In this regard we are appending the Conclusions of the Subcommittee on House Cooling together with some pertinent questions and answers on the subject.

Subcommittee Conclusions

"Research in house cooling is only begun in this very general preliminary report. The actual merits of house cooling can be demonstrated only by actual experimentation and application of the principle to a series of specific cases. Test results cannot be obtained in a day, nor even during the first year. Experience will bring forth vast improvements as it has in the case of the household gas refrigerators.

"The real problems remain unsolved—

1. Who will undertake this important work?
2. When can it be commenced?
3. How can it be best accomplished?

"These are the problems which are beyond the scope of your committee to decide. Suggestions and recommendations can only be submitted for your attention.

This large New York apartment hotel is equipped throughout with gas refrigeration

It would seem to impose an excessive burden upon any manufacturer to carry on complete research in house cooling. The field will of necessity be limited at first when the idea is new and the system untried. The gas industry should not only devote time and facilities to cooperate with the manufacturer, but should make an appropriation to assist in the construction of experimental units. The work should be pushed with all possible facility so that by the 1929 convention actual test data will be available. The best talent in the country should be enlisted in the enterprise so that no time will be wasted.

"The systems could be tried out in 'all gas' homes for advertising and demonstrating purposes. It is the problem of the gas industry to establish house cooling as a reality.

"In response to letter of inquiry from the chairman of the committee, the following statement discussing a number of phases of house cooling was prepared by Mr. W. H. Carrier, president of the Carrier-Lyle Corporation, Newark, New Jersey.

"Mr. Carrier is a past president of the American Society of Refrigerating Engineers, an officer of the So-

ciety of Heating and Ventilating Engineers, and is a recognized authority on the subjects of heating, ventilating and refrigeration.

"Topic 1. The desirable temperature for a dwelling during the summer time. If this is affected by the outside temperature, what would be correct for temperatures of 80, 90, 100 and 110°?

"The desirable temperature for a dwelling during the summer time is a minimum of 72°, with the same temperature outside and no refrigeration required, to a maximum of 80° with an outside temperature of 90° or above. Any point between these limits should be satisfactory at the temperatures given. If the outside temperature goes above 95°, it is just as well, from the standpoint of economy, to allow the inside temperature rise to correspond to the limiting capacity of the machine. In other words, above this condition you would obtain the full refrigerating capacity possible and that is all.

"Topic 2. Is house cooling an aid to health or would people afflicted with certain ailments be affected?

"House cooling is an aid to health if not overdone. Human efficiency is dependent in a large measure on the surrounding temperature. The extreme heat of summer is injurious to those who are not in good health, while to those in good health it only seems to reduce their efficiency. One of the difficulties on a hot summer night is to obtain satisfactory rest. In properly cooled bedrooms, the rest obtained can be just as refreshing in the hottest summer weather as in winter. House cooling together with air filtration, should be especially beneficial in summer to sufferers from asthma. This has been found to be the effect in similar theatre ventilation.

Data for Calculation

"Topic 3. The number of air changes to be used in calculating cooling losses with particular reference to dwellings. For figuring other heat losses can we use standard heat loss figures as employed for heating purposes?

"In calculating the thermal loss in cooling the dwelling, allowance must be made for heat transmission through building materials between inside and outside temperatures, and allowance must be made for infiltration of outside air just as in computing heating jobs but, in addition to this, allowance must be made in cooling for the heating effect of the sun on the exposed side of the building. So far as the windows are concerned, these should be provided with awnings so that the effect would be greatly reduced. But, there still remains the effect on the outside walls and roof. The effect on the roof, however, where there is an uncooled attic space is not a very important one in affecting the general load, but it does, however, have some effect upon the rooms just below the attic although not to the extent it has in heating. The air change losses in summer in cooling are not as large as in heating, owing to the smaller difference in temperature. There are certain losses, however, that are necessary on account of ventilation and air circulation. I do not think it is safe to figure a fresh air supply, either through infiltration or through the apparatus, or less than once an hour. With respect to air change, the calculations for refrigeration are quite different than the calculations for heating. In heating, the air introduced only has to be warmed, while in refrigeration the air introduced has not only to be cooled but to have a large quantity of moisture removed. The latent heat thus removed from the air by condensation in the cooling system is in general several times as great as the sensible heat brought in by infiltration. An average maximum moisture content of air may be taken as 8 grains to the cu. ft., while the air in the room under corresponding conditions should not contain more than 6 grains of moisture to the cu. ft. This would mean the removal of about .3 B.t.u. of latent heat per cu. ft. of air.

Use of Insulation

"Topic 4. In a house cooling plant the cool air descends; should, therefore, the basement floor be lined with some insulating or other tight material in order to prevent the escape of cold air into the cellar; and reversing, will the warm air directly under the roof act as an insulator and consequently, make the roof construction of but minor importance?

"In a house which is to be cooled, I would always recommend sealing the basement. This, in fact, should be done for heating where gas is used. I would also recommend roof insulation in all cases. This, however, is primarily for heating. I do not think, however, it is worth while to especially insulate the floor other than sealing the basement.

"Topic 5. What method of automatic control is desired? Would not the evaporator temperature have to be controlled and the refrigerating plant started and stopped according to room temperature or relative humidity?

"Various methods of automatic control could be used, but the refrigerating machine should be designed to control automatically the evaporator temperature, especially so that it would not go below the freezing point of water. The refrigerating plant could be started according to the room temperature and humidity, or better, the output could be reduced in accordance with the demands. The 'off' and 'on' proposition is not entirely satisfactory as the method of distribution and is apt to cause discomfort where cooling of the room is procured by air circulation.

Single Unit for Heating and Cooling

"Topic 6. To what extent may house heating equipment and cooling equipment be constructed in common? In other words, is it feasible to use an automatic steam boiler for house heating, employing either direct or indirect radiation, and then to install a steam heated absorption unit in the attic by this same boiler?

"House heating and cooling equipment may be constructed in common only as air heating is used. Refrigeration cannot be installed satisfactorily in a house except by means of an indirect method in which a positive and sufficient air supply is mechanically provided for all rooms to be cooled. This provision of air supply I, personally, also consider the best method of heating and where a building is to be cooled the same ducts that are used for cooling will be available for heating, and preferably should be so used both from the standpoint of economy and improved heating effect. It is not feasible to use the ordinary direct or indirect radiation in any way for cooling. The boiler, however, can be, and should be, used in an absorption system.

"Topic 7. In your opinion what is the type of equipment that is most likely to bring about an early acceptance of home cooling? Will it be something as mentioned in the previous question, or do you believe

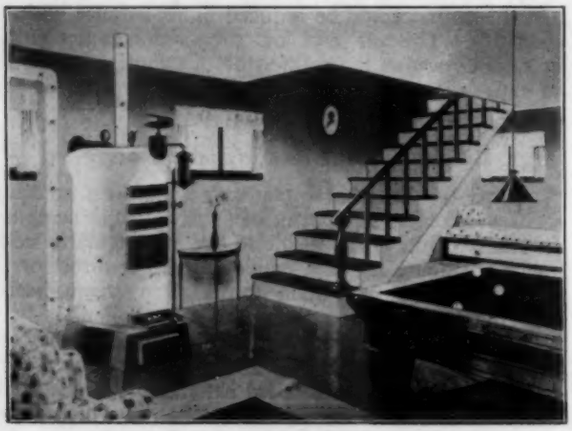
it may possibly be a direct gas-heated absorption machine?

The type of equipment that will bring about home cooling is an equipment which will operate in conjunction with the heating equipment and this will mean mechanical circulation of air both for heating and cooling. In fact, the whole plant must be designed as a complete air conditioning plant available both for winter and summer. The heating element may be a direct gas-fired furnace or it may be a steam boiler, gas operated, using a heating stack for an air heater in the basement in the winter. There is a possibility that other types of gas-fired refrigeration will be developed which do not require a boiler in the ordinary sense. If so, that will be quite an improvement over the usual type of absorption machine."

House Heating

A mass of meaty material is contained in the Report of the House Heating Committee and considerable credit is due Mr. Thomson King, Chairman, and his associates for their fine presentation of this subject. A thorough study of this report is imperative on the part of all gas men directly connected with the particular company's house heating department.

Obviously the house heating department should pay increasing attention to the matter of insulating the home, and to this end constant and intelligent pressure should be brought to bear on architects and builders. The house heating salesman should at all times keep himself posted on the new homes being erected and should make periodic visits to the city Building Department.



A modernized cellar. Coal-burning boiler converted to the use of gas with Barber Conversion Burners.

The subject of Converted Installations is coming rapidly to the fore and it is our opinion that these are worthy of being pushed, provided the matter is handled with intelligence. Many home owners cannot see their way clear to make the outlay for a furnace designed to burn gas but might stretch the point to have gas house heating by way of installing an approved, well designed burner in their existing coal furnace. There are several of such burners available and granting that it is preferable to sell the entire heating unit where possible it should be borne in mind that the converted installation forms a stepping stone to selling the complete gas fired house furnace at a future date.

It also appears that the gas house heating man should not only be conversant with house heating furnaces but should also post himself on the subject of the heating system piping and radiation and their possible faults and remedies therefor.

Below are given some of the conclusions of the various sections of the Report of the House Heating Committee.

Conversion Burners

"The whole thought on the conversion burners as a whole against straight gas designed equipment is strongly in favor of a straight gas designed boiler or furnace. While their first cost is generally higher than the conversion job, they are so well designed, both from mechanical and safety standpoints, and their efficiency is so high, that it is the committee's opinion that this equipment is much to be preferred over any conversion system. However, there are some instances where conversion equipment has a field; but these cases are in the minority and are greatly outweighed by the factors which the straight gas equipment has in its favor."

Insulation

"The general recognition of insulation must be accomplished before maximum results can be anticipated. A glance over the situation today is very encouraging when we see, first, that the insulation manufacturers themselves have their own organization, which is set up to improve their business methods, to censor their advertising copy, etc., thus minimizing unjust or unwarranted claims. Such organizations as the American Society of Heating and Ventilating Engineers, U. S. Bureau of Standards, and various state universities throughout the country are, at the present time, studying the insulation problem and are quoting their results (standards which are common to all and which cannot be misinterpreted).

"One of the important agencies through which the development of insulation must gain recognition is the architects. It must be borne in mind that the architect is an extremely busy man and, therefore, will not give much time to a long harangue of sales talk. On the other hand, this same architect will give his undivided attention to the presentation of the cold facts regarding insulation data. It must be remembered that this is, relatively speaking, a new field. There is somewhat of a public demand for more information on the subject today; therefore, the architect must have accurate information in his hands, which is reliable and authoritative, or this agency will more than likely ignore the advantages of insulating materials entirely.

Insulation Manufacturers' Interest

"The gas companies must always remember that if the heating contractor is installing the heating system, he is responsible for satisfactory and sufficient heat distribution. If we attempt to name the amount of radiation required in these cases, we are usurping the responsibility and automatically release him. We should, therefore, confine ourselves to estimating savings in the

heating bills effected by insulation and leave the heating system design in the hands of the heating contractor. This points out the activity which the insulation manufacturers and other agencies interested, directly or indirectly, in the development of the insulation industry, must take up. Heating contractors' associations must have accurate and reliable information on the insulation factors. Many of these agencies today are recognizing insulation, notable examples being the Chicago Master Steam Fitters' Association and the Illinois Master Plumbers' Association. The Illinois Master Plumbers' Association at the present writing, have a special bulletin compiled, from which their members calculate heat losses from insulated homes. Since they are more or less pioneers in this field, it would be advisable for our association members to procure this booklet and see what they have done.

"The special bulletin of the Illinois Master Plumbers' Association, mentioned above, can be had by writing their secretary, Mr. C. A. Bolten, c/o Illinois Master Plumbers' Association, Chicago Heights, Illinois. Material aid can also be gotten from the Guides published by the American Society of Heating and Ventilating Engineers. Universities making studies of heating problems publish their results in engineering bulletins which can be gotten by writing the respective university, c/o their Engineering Experiment Station."

Companies Starting to Promote House Heating

It is deemed worth while to also give a listing of companies which are starting to promote house heating.

Public Utilities Consolidated Corp., Nogales, Ariz.

Southern Counties Gas Co. of California, Los Angeles, Cal.

Coast Counties Gas & Elec. Co., San Francisco, Cal.

United Gas & Fuel Co., Hamilton, Can.

Eastern Connecticut Power Co., Putnam & Danielson, Conn.

Georgetown Gas Company, Georgetown, Del.

Public Utilities Consolidated Corporation, Pocatello, Idaho.

Princeton Gas Company, Princeton, Ill.

Rockford Gas Light & Coke Company, Rockford, Ill.

Northern Indiana Fuel & Light Company, Auburn, Ind.

Iowa Public Service Company, Ft. Dodge, Iowa.

Ottumwa Gas Company, Ottumwa, Iowa.

The Prairie Oil and Gas Co., Independence, Kan.

Cumberland and Allegheny Gas Company, Cumberland, Md.

Adams Gas Light Company, Boston, Mass.

Citizens' Gas Electric and Power Co., Nantucket, Mass.

Clinton Gas Light Co., Clinton, Mass.

Leominster Gas Light Company, Leominster, Mass.

North Attleboro Gas Light Co., North Attleboro, Mass.

Northampton Gas Light Co., Northampton, Mass.

Holland Gas Company, Holland, Mich.

Michigan Federated Utilities, Sault Ste. Marie Division, Sault Ste. Marie, Mich.

Citizens Gas Co., Hannibal, Mo.

Saugerties Gas Light Co., Saugerties, N. Y.

Gastonia and Suburban Gas Co., Gastonia, N. C.

The modern trend: installation of Kernit gas-fired incinerator in apartment kitchen.

Tide Water Power Company, Wilmington, N. C.

Carbondale Gas Company, Carbondale, Pa.

Chambersburg Gas Company, Chambersburg, Pa.

Lock Haven Gas and Coke Company, Lock Haven, Pa.

Pennsylvania Power and Light Co., Allentown, Pa.

Pottsville Gas Company, Pottsville, Pa.

Austin Gas Company, Austin, Texas.

Consumers Utilities Company, Staunton, Va.

Consumers Utilities Company, Winchester, Va.

The Petersburg Gas Company, Petersburg, Va.

Martinsburg Heat and Light Company, Martinsburg, W. Va.

Wisconsin Michigan Power Company, Appleton, Wis.

Wisconsin Gas and Electric Company, Watertown, Wis.

Incinerators and Laundry Equipment

Much has been written and said of the desire of the house wife to rid her home of the gas nuisance, to always have hot water available at the turn of the faucet and other inconveniences which gas will eliminate. However, particularly in the summer months, there is nothing quite so repellant as the garbage nuisance which the proper incinerator will effectually nullify. If ever a gas salesman did a good turn for the home it was when he caused to be installed in the same a gas fired incinerator.

We concur with Mr. John A. Weiser, Chairman of the Committee on Incineration by Gas, when he says that "sales efforts along this line is woefully lacking

Who
wants the Children
to play around the
Garbage Can?
The Incinerator safeguards your home and health
Children get into things—everything. And so do their animal playfellows . . . then track germ-infested garbage into the house.
Science, safety, decency and cleanliness demand the elimination of the garbage can—the breeding place of flies and other disease-carrying insects.
And to take its place the INCINERATOR, which quickly reduces wet garbage and rubbish to a harmless ash before they accumulate. This, too, prevents the household "trash heap"—a menace which causes six out of every ten fires.
Careful parents and good neighbors will investigate the INCINERATOR . . . finding that it can be installed in a few minutes, is easy to operate, and costs but little.
Call on your gas company for demonstrations of incineration, house heating, cooking, water heating, refrigeration and other uses for GAS—THE BETTER FUEL
get rid of the garbage with
Gas
. . . THE BETTER FUEL

Without intelligent and forceful advertising the sale of incinerators will merely drift along.

in the gas industry and that the first problem to be attacked and solved is that of sales promotion."

This report suggested the following plan for furthering the sale of this appliance.

"1. That 'Sanitation by Gas Incineration' be adopted as a national slogan.

"2. That the advertising campaign which consists of the following be approved by the A. G. A. and sold to gas companies at cost.

"A. Dual use of letters, size 8½x11, printed throughout in two colors with gas company's name. This letter to teach the public the evil of flies, odor, germs, vermin and filth from garbage and refuse kept stored around the premises.

"B. Four-page letter folder printed in two colors with gas company's name printed thereon. This letter to show how the evils of garbage and refuse can be disposed of in a sanitary way by the use of the gas incinerator.

"C. A folder that will describe in an interesting way why gas incineration as recommended by the gas company is the best and most sanitary way of disposing of all garbage.

"D. Fourteen-page book with gas company's name thereon that describes sanitation by gas incineration.

"The entire outline of this plan showing letters, booklets, pamphlets, etc., is on file in the office of J. W. West, Jr., secretary, Commercial Section, where it can be seen by those interested. The cost of producing the campaign outline is very small and when purchased in thousand lots would mean but a nominal outlay to develop this incineration load.

Care in Installing Incinerators

"The committee wishes to caution gas companies and dealers who are selling and installing incinerators to make a careful study of properly installing these machines in the right places so that they will work in a most efficient and satisfactory manner. They should not be placed in homes that have faulty flues but should be placed in as near perfect conditions as possible so that one bad installation will not cause the loss of several future sales nor cause the discontinuance of the use of other incinerators owned by customers who might hear of such faulty installation.

"By constant advertising, the best of cooperation between manufacturer and gas company and great pressure upon the Sales Department of the various companies to produce results, this gas incineration load can be sold.

"This is a desirable load from the gas company's standpoint in that a gas incinerator is usually used during the off-peak periods of the day; and it is also a desirable load, because the machines as produced at present require little or no maintenance. Your committee strongly urges that each of you put forth your

Use the Gas Line –
Not the Clothes Line
Washday depends on the weather when you depend on the clothes line—and the weather is a fickle proposition.
The gas line has given nearly eighty years of continuous service. That is why any day is a perfect washday when you equip your home with a gas clothes dryer.
Telephone: TRIangle 7500
The Brooklyn Union Gas Company
Mail This Coupon Today
The Brooklyn Union Gas Company,
New Business Department,
180 Remsen Street,
Brooklyn, New York.
Please furnish details about the gas clothes dryer. It is understood this will not obligate me in any way.
Name
Street
City

The Brooklyn Union Gas Company has the right advertising slant in selling laundry equipment.

best effort to secure as much of this load in your respective communities as you can possibly get."

We have always maintained that wherever possible the housewife should be sold a complete outfit of laundry equipment. Further, it is generally agreed that, other factors being equal, the housewife would rather have her laundry done at home; it is more tasteful to her and she knows that her family's linen will last longer than if laundered on the outside. The report of the Domestic Laundry Equipment Committee is correct when it states that unless the housewife has a complete set of laundry equipment she will gradually have all of the washing done on the outside.

Here again we have the proposition of the sales force going actively after complete laundering installations if it is to hold the pace in this direction.

Commercial Laundry Campaign

Part of the comprehensive report of the Committee is given.

"Investigation by the Committee has developed the fact that there is an increasing tendency on the part of owners of washers, and washers and ironers, to make frequent use of the commercial laundry, because of the inconvenience and labor experienced on account of not having a dryer or dryer and ironer. This tendency is being given a decided impetus by a national campaign on the part of the commercial laundries, to sell the idea of the commercial laundry. This campaign, which started in the fall of 1927, was set up to cover a period of five years, with a budget of $20,000,000. Such a campaign cannot help but make itself felt, regardless of whether or not the total results are satisfactory to those back of the campaign.

"If the trend of the times is any criterion, no customer will long remain satisfied with an incomplete job. It will not be long before the customer having an incomplete laundry unit and using the services of the commercial laundry at intervals, will get the habit and eventually discontinue doing any laundry work at home —unless that customer is sold the complete unit and learns that, with a modern laundry, wash day means little or nothing in the weekly schedule.

"It is the unanimous opinion of this committee that keeping the laundering at home can be best insured through complete laundry unit, washer, dryer and ironer, whereby most of the irksome features of the domestic wash day are eliminated—that the complete laundry unit is the only effective weapon the gas company has, with which to combat commercial laundry competition.

Keep the laundering at home

"It is also the unanimous opinion of your committee that while keeping the laundering at home through the promotion and sale of the complete laundry unit is of concern to every manufacturer of domestic laundry appliances, manufacturers of washing soaps and washing powders, and to the electrical industry, the gas company stands to lose as much as any other industry, whenever the laundering leaves the home.

"It is quite evident that intense activity in the promotion and sale of gas-heated domestic laundry appliances is vital to the gas industry and that it should take a leading part in the campaign for keeping the laundering at home."

Home Service

It is universally agreed that Home Service efforts on the part of any gas company represent a work that should foster load building and make for pleasant relations between the company and its customers. Accordingly those actively engaged in such work should see to it that they are not merely indulging in pleasant "pot boiling." Rather they should plan every Home Service activity with two questions in mind; will this work directly result in the community making greater use of their ranges, thereby increasing the load? and, will this work engender a kindlier feeling on the part of the public toward the gas company? If the Home Service Director can answer these questions in the affirmative she can be reasonably certain that she is headed in the right direction.

In her address, Serving the Home, Katherine A. Fisher, Director, Good Housekeeping Institute, made the following interesting remarks concerning Home Service.

"I have been very much interested in following the development of home service work within your industry. It is work which has already justified its existence and it holds much promise for the future, with steadily increasing facilities for serving the home. It is work which calls for versatility and for vision on the part of the home service worker. I have said that more than ever the home-manager needs to develop a sense of relative values in her selection and use of equipment. Women in home service departments can help her to do this. To take full advantage of their opportunities for service, they must be broadly in touch with housekeeping problems and with questions relating to house management in general. They should be given time and the necessary facilities to thoroughly study the best use of new types of equipment or of any new refinements in equipment and I believe that they should work in close cooperation with the technical staff in their organization. For, because of their training and their contacts with the home, they are in a position to give constructive advice as to the value of any new type of equipment or of any changes under consideration in equipment already in production."

Gas Water Heating

It is distressing to enter any new house of a fair quality and find its hot water needs taken care of by a tank water heater in summer and a furnace water heater in winter. Nevertheless, there are a multitude of homes of, not only fair quality, but houses costing upwards of eighteen and twenty thousand dollars, that boast of such ancient equipment. The moral back of this situation is that there is still much sales effort to be done on the part of gas companies and, in turn, still a great many choice sales plums waiting to be plucked by the energetic salesman.

With a number of high grade, likely looking automatic gas water heaters being manufactured the appliance salesman has an item and service to sell that should meet with a minimum of sales resistance.

From the able Report of the Water Heating Committee we select for consideration the contribution of H. J. Long as being worthy of careful thought.

"To those of us who for twenty years have worked, dreamt and talked Water Heating, it has seemed that

the wheels of progress have turned very slowly indeed.

"Standing at the threshold today, however, and viewing the vista there opened to our gaze, no one can doubt that the "Gas Water Heating Age" has arrived. The past years have been preparing the way. The stage has been set—and now the drama is on.

"Who can doubt the tremendous possibilities of the self-action storage gas water heater for the next few years. No matter where the gas executive may turn for increased gas revenue, under the most favorable prices and with the most favorable load, inevitably his eyes must turn to the self-action water heater in the home. Actual figures are not necessary. The gas range has become standard. Its greatest possibilities lie in new homes, and in the new and improved stoves to replace old ones, and thus promote a greater use of cooking and to retain the volume of gas already in use. Unfortunately, the records of many gas companies show that cooking by itself rarely requires sufficient gas per month to make the customer a profitable one to the company. By means of the range, gas had been sold to the customer as a fuel for the home, and this alone does not pay.

A Stop Gap

"The tank water heater is only a stop gap. It has served its purpose. It has shown the home owner how simple it is to heat water with gas, but it has not given him the maximum service of which gas is capable, the perfect service which he really wants, and which only **gas can give**, nor has it made the user a profitable customer for the gas company.

"Why do I herald 1928 as the stepping stone to tremendous water heater sales? Because the barriers which stood in the way have been or are rapidly being broken down.

"The biggest problem of all has been to sell the gas man himself on the value of his own fuel. For years he has been telling customers how to save gas, how not to use it. They were told to read the meter every few days and if their gas bill was going up a trifle, to stop using so much gas. A gas bill complaint was a signal for an apology.

"Curious as it may seem, gas house heating has helped more to sell gas water heating than anything that has happened in twenty years, simply because the gas man has discovered that gas is worth what it costs in the service rendered.

"There are thousands of families enjoying the perfect hot water service that only a self-action storage water heater can give at a cost of about 30 cents per person per week. About the cost of a weekly bath in the old fashioned barber shop. Five dollars a month for a family of four people is certainly small cost for what they receive in comfort and convenience.

"Sell Self-Action Storage Water Heaters" should be blazoned atop the list on every sales manager's plans. His company wants the gas sales, his public needs the service. Selling the water heater, therefore, is intelligently presenting its ability to serve to the greatest possible number of people. There are two steps in a sale—first, telling the story of what a self-action water heater will do, and creating a desire to own one, and second, the closing of the sale.

"The first can be done with publicity—every form of publicity available. One large company in New Jersey has signboards all over their territory beautifully illuminated at night, 'Hot Water at the turn of a tap.' Direct-by-mail—or personally delivered literature should go into each home, several times a year—'as falling water wears away a stone.' For the results obtained newspaper advertising may be relatively expensive for large communities, particularly for educational purposes, but for the second step in the sale, a few well chosen closing ads can prove of incalculable help, but in closing the sale, man-power is the answer. The man must know 'Hot Water.' He must know the game, but above all he must be enthusiastic about it. One enthusiastic water heater man in town will do as much business as a dozen lukewarm men. Make the pay worth while so that a good man can make big money. Don't let someone else's salary be the limit that a salesman can make selling 'Self-Action Water Heaters.'"

"Bring in the plumber. It is not necessary to make it a matter of brotherly love. Make it a business proposition. The self-action water heater is a good plumbing appliance. The plumber can sell them if he will. Give him the ammunition. Tell him the sales points—make it worth his while—show him that it will pay him to work with you. Every heater sold is to some plumber's customer. If he fights you he loses, if he works with you he gets his share. The journeyman gets $1.00 or more an hour. It is expensive for the plumber to give service and make calls which the gas company will do for nothing if they work together. When he uses the gas company heaters, it is all profit when the job is done, and he has switched all responsibility to other shoulders. Make it worth while for the salesman also to work with the plumber.

"Above all, sell high quality merchandise. Of what avail are volume sales, if the appliance does not continue to give service so that it is used at the maximum year after year. A satisfied customer means a satisfied gas user, and a water heater that continues to give a perfect service year after year is the only one which accomplishes this purpose.

"The actual sales of self-action water heaters today in this country should be an inspiration to the gas fraternity to double and triple their business. One heater manufacturer who five years ago made range boilers almost exclusively is alone doing more business yearly than the combined output of all manufacturers ten years ago. One hundred or more manufacturers are now marketing self-action storage water heaters and the business is barely started. The combined selling activity of this large number of manufacturers is selling the idea of gas heated hot water. The gas company should lead in this field. All that they need is 'Self Action' in the organization to put 'Self-Action Heaters in Every Home.'"

Advertising and Window Display

The strides that are being made by gas companies in advertising in all lines was amply evidenced by the various reports and addresses on this subject. It is quite apparent that the industry is planning such activities along sound and productive lines. The good work must keep up and broaden. Further, cooperative advertising will bear careful investigation, if the results that are obtaining in New England are a criterion.

The smaller companies that are not sure of their ground, insofar as advertising is concerned, should avail themselves of the assistance offered by the American Gas Association.

Advertising in all its diversity is a task that the industry is tackling in a big way and there should be no marking time in the matter.

Window Display, which goes hand in hand with advertising, is also being studied in a logical way and gone are the days when a greater percentage of gas company windows were as ugly and repellant as the average plumber's window. The Annual Report of the Window and Store Display Committee reads in part:

"Disregarding numberless statements to the contrary, in the final analysis, window display advertising rarely actually sells gas appliances. Advertising executives do not expect it to. Rather, its primary function is to create the initial desire of possession.

"Just as newspaper, billboard, direct-by-mail, and all other forms of advertising strive to arouse interest in a product, the best display advertising is devoted to the important phase of salesmanship of arousing interest in a new appliance or re-arousing interest in one already well known.

* * * * * *

"Simplicity is, without a doubt, the most desirable quality a window display advertisement can possess. Justly, the uninvolved display receives more attention because it is considerate of people's time. There is no chance of monotony in the message it presents because its aim is to bring home just one thought. The observer is not burdened with statistics, whys, or wheretores.

"This type of display is most effective when employed to advertise an appliance that needs little introduction. Water heating is a case in point. Most gas companies have already advocated the gas water heater sufficiently to make further lengthy preambles somewhat boresome.

Avoid cluttered up windows

"That display that expresses one impelling idea leaves more of an impression on the observer than its cluttered rival. We are occasionally forced to express several ideas in one display especially when a new appliance is being introduced. It is advisable, however, to single out the individual selling points of any given appliance at the earliest possible moment and devote an entire window display to each in turn.

* * * * * *

"Lettering must be closely co-related with the mood of a window display and must be a part of the general design. Good lettering is as different from sign painting as window display advertising is from window dressing.

"The best hand lettering commands a price, but it is invariably worth more than it costs. Whenever we attempt to create the desire of possession or sell an idea, the copy, in the final analysis, is the all-important element of the display. To be sure, the artistic presentation and balance of a window display are important, but these are primarily to entice the passerby to a position where he or she can read the message we are endeavoring to present.

* * * * * *

"Almost every one is frankly puzzled by the paradox that heat makes ice. Gas consumers actually want to know how gas heat produces refrigeration.

"Obviously, the mere showing of a gas refrigerator in a window will accomplish no more than the announcement that refrigeration by gas is an accomplished fact; i. e., it will create a certain amount of interest, and people will say with surprise, 'Is that so?' but it will rarely increase gas consumption.

"Gas refrigeration can be sold only by means of facts. Consumers must be educated to the point where refrigeration by gas means to them no moving parts, cheaper operation, no replacements, silent operation, no interference with dad's radio, and a host of other advantages."

Industrial Gas Survey

Considerable credit is due the Industrial Gas Survey Committee for its comprehensive report and it is to be regretted that more companies did not see fit to pool its data and information in the common cause. Without a mutuality in exchanging ideas we are indeed groping in the dark. This is particularly so with our Industrial Gas business, one of the industry's mainstays. We would add our voice in urging that gas companies "go the limit" in supplying information to future reports of this character.

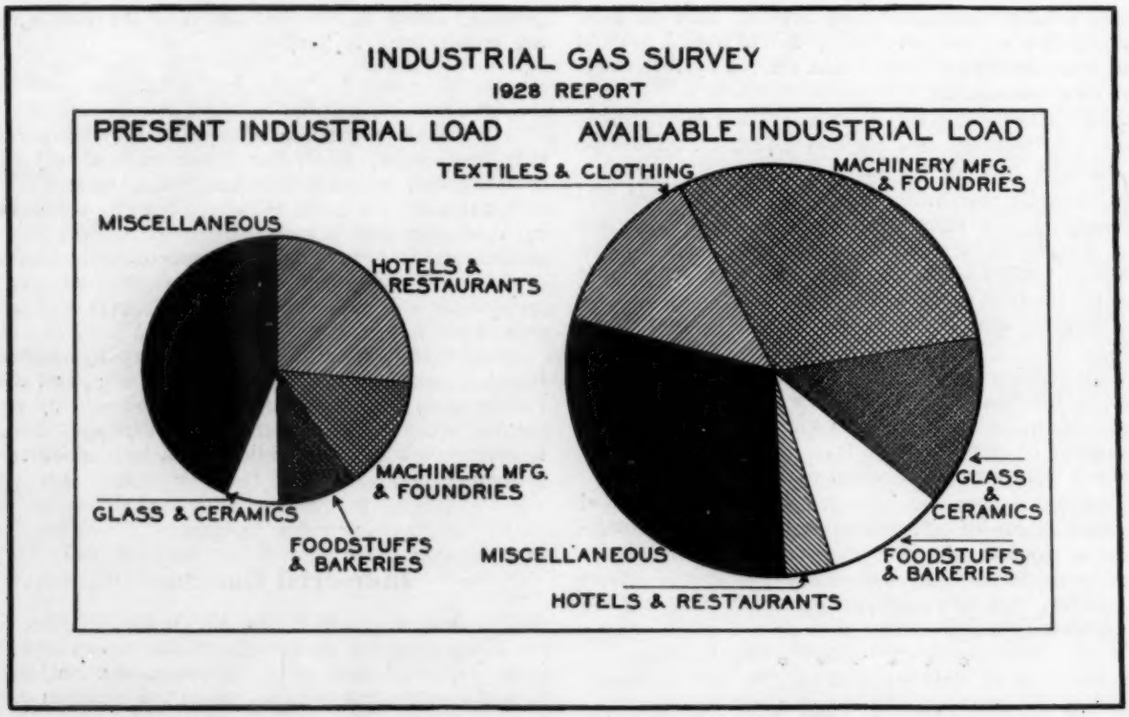
In any event the herewith appended abstract of the 1928 Committee Report should cause us to view future Industrial business with considerable optimism. This committee was headed by Ralph L. Manier.

"The Survey Committee was formed in 1924. The program consisted in interesting the various gas companies in making surveys to determine the nature of their present business, and the possible future markets for their gas. This information is absolutely essential to sound business sales methods, the determination of necessary rates and rate structures, and the healthy maintenance of the business which they now enjoy.

"It has been difficult to get the full cooperation of the gas industry, primarily from the standpoint that we are all exceedingly busy, and until the full importance of the survey was appreciated, it was slow going. There were 24 completed reports submitted covering the 1924 sales, as presented at the 1925 A. G. A. Convention. This grew to 52 in the 1926 report, 165 known surveys in the 1927, and to 245 with this year's activities. Of the 245 reports submitted, 14 are from our new brothers, the natural gas companies.

"There are many companies who do not desire to let data of this nature out of their own files. Records of such companies, therefore, do not show in the report, and there are doubtless many surveys completed in fine form of which we have no knowledge.

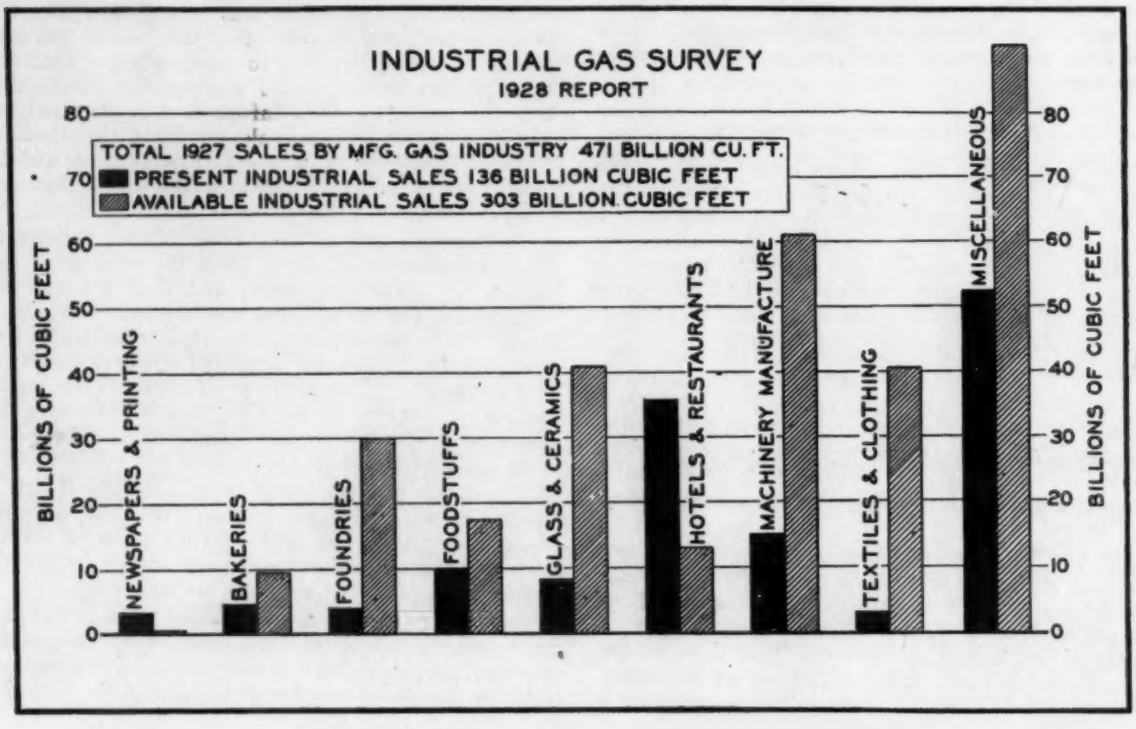
"In order that you may visualize what a stupendous future there is before the gas companies, we are pleased to submit graphical charts, showing the present business in billion cu. ft. of gas per year, against the available



business. These charts were prepared by Paul Ryan, Statistician at A. G. A. Headquarters. The figures were determined by assuming that a group of the more carefully prepared surveys would indicate the condition throughout the United States in the manufactured gas territories.

"From the charts, it appears that the largest field is in the miscellaneous unclassified uses of gas, and the next largest is in the machinery manufacture. For the benefit of those who are new to the survey, we will carry through each group, telling the uses which come under the individual headings, and the amount of business which can still be gained through proper effort and proper rates.

"The available bakery business, amounting to ten billion cu. ft. per year, consists for the most part of



a very large number of medium size bakeries, employing from one to three peel-type ovens, most of the large bakeries already having gone to gas.

"The available foodstuffs, representing 18 billion cu. ft. per year, includes steam cooking loads, smoking and drying of foods, frying of potato chips and fish, candy making, and preserving of fruits.

"The available foundry load consists of 30 billion cu. ft. per year, and includes core baking, mold drying, ladle heating, malleablizing, and brass and aluminum melting.

"The glass and ceramic industries, representing an available sale of 41 billion cu. ft., cover such uses in the glass industry as melting furnaces and annealling furnaces, biscuit, gloss, decorating kilns, and frit furnaces are used in the case of china and porcelain ware, while continuous, cove or bee-hive kilns are used in brick burning. The large field of vitreous enameling also is in this classification.

"The uses of gas in hotels, clubs, restaurants, and institutions are fairly well sold, there being only an additional use of 13 billion cu. ft., which consists of gas for cooking, large volume water heating, and steam for laundry and sterilizing purposes.

Machinery Manufacture Prospects

"The second largest available field for gas use is in the machinery manufacture, and represents 61 billion cu. ft. of gas per year, which will be used in the various heat applications to bring such raw materials to the finished state for the machines. Such uses include forging, normalizing, carburizing, hardening, drawing, and annealing operations, japanning, brazing, soda kettle and plating tank heating, metal melting, soldering, and similar operations.

"Newspapers and publishers represent an available field of only 400,000,000 cu. ft. of gas per year, and cover stereotype melting, linotype melting, dross furnaces, steam tables, mat roasters, electrotype furnaces, and wax kettles.

"The textile and clothing manufacturers represent an available field of 40 billion cu. ft. per year, and cover burners for properly finishing the cloth, and uses of steam for pressing, dyeing, drying, and sponging.

"Without a doubt, there are a number of the above uses of gas included under the miscellaneous group by many of the companies, but we can safely say that great inroads will be made into each of these blocks before the termination of the current year.

"The Survey Committee is pleased to state that Mr. G. W. Allen has been doing some exceedingly good survey work in Canada, but did not have his reports in condition for presentation. Mr. Allen has used the newspapers for a great deal of publicity work, so that the industrial customers of the city know beforehand that a representative will call upon them, and analyze their heating conditions with a view to improving their efficiency where possible. He has given lectures while making surveys in the various cities, with the result that people have become greatly interested in gas, and very receptive to the survey."

Industrial Rates

The Committee on Industrial Rates points out that "such a study must involve a complete engineering analysis of each process, a determination of the efficiency of the gas application, what possibilities there are for improving this efficiency by better application or by the development of improved apparatus."

Obviously this calculation of wholesale rates for various industrial customers is quite involved and at best it would seem that any findings must be of a general nature and dependent on local conditions. However, the Industrial Gas Engineer should not regard the problem as devoid of any solution but should consider it as a part of his duties to develop rates that will get a maximum of business and still yield his company the proper revenue.

The Report contains a study of large volume baking by E. J. Devlin which contains data that many can use immediately.

Study of Large Volume Baking

"The importance to the gas industry of large volume baking can scarcely be overstressed. Within a period of less than 10 years a great change has taken place not only in the ovens themselves but in the fuel application. The development of mixing machinery and automatic dough-handling machines has called for ovens with traveling hearths. With the advent of these the development of large volume baking has increased rapidly. An oven that can turn out 6,000 lbs. of baked bread each hour is a factor in the baking industry that is transcendent; the advantages of gas become apparent and the little attention that is required makes the oven almost automatic. Great baking corporations, whose plants heretofore were housed in large rambling buildings with peel ovens scattered about, soon realized the advantages of the compact system possible where gas-fired traveling ovens are used. Old equipment has been discarded and the new system that permits the delivery of wrapped bread, untouched by human hands from the instant the flour is dumped in the blender until the package is opened by the consumer, has made a strong appeal to the public. The new system reduces chaotic conditions to absolute order so that the large plants are able to trace costs and profits to the .001 of a cent per lb. One large plant, using three traveling ovens, found in one year its net profit per lb. of bread was .3 of a cent. At first glance that figure looks as though it opened a vista of insolvency when the large cost of the equipment is considered, especially as the one lb. load sold at an overall price of about nine cents. However, when it is considered that this plant averages 160,000 lbs. of bread every day for 300 days in the year, totaling 48,000,000 lbs. of bread, the .3 of a cent net profit per lb. means $144,000 net profit on the item of bread alone.

Large Use of Gas

"Today about 85% of the bread and 25% of the cake of the country is produced by professional bakers, and this is largely done through the application of gas. Gas has proved to be an ideal fuel for the purpose. Due to the fact that the products of combustion of gas are not deleterious to bakery products, direct applications are permitted that are not possible with other fuels.

The facility that gas gives for control makes it ideal. Electricity, the chief competitor of gas, while not yet entering the field to any large extent has penetrated in some places through two conditions. One of these is that with electrically heated ovens, the B.t.u. expenditure per lb. of bread has been reduced and the other is that the low rate per kw. hr. of off-peak periods has made it possible in some cases to bake bread with

QUESTIONNAIRE SUMMARIZED DATA LARGE VOLUME BAKING

Installation	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Raw material (loaves)	1 lb., 1½ lbs., and 3 lbs.	22 oz.	1 lb., 2 lbs., and 3 lbs	13 oz. and 20 oz	1 lb.	1 lb., 2 lbs., and 3 lbs.	1 lb., 2 lbs., and 3 lbs
Operating cycle and amount of work handled	10-hr. shift, 12,050 lbs.	5 to 6 hr 7 to 8 M loaves	19 hrs 109,700 lbs.	11 hrs 19,000 lbs.	14 hrs. 18,000 lbs	19 hrs. 35,000 lbs.	22 hrs. 51,000 lbs.
Type of apparatus	Baker-Perkins	Baker Perkins	Baker-Perkins	Comstock	Baker-Perkins	Baker-Perkins	Baker-Perkins
Approximate Dimensions	86' l. x 9' w x 6' 6" h.	19' 3" l. x 9' w x 8' 6" h.	110' l. x 6' h.	75' l. x 8' 10" w. x 5' 5" h.	80' l x 9' w. x 6' h.	110' l. x 9' w. x 6' 6" h.	75' l x 9' w x 6' h.
Refractory and insulation, kind and thickness	4" magnesia bl. and ½" white tile covering	6" high pressure magnesium block	4½" firebrick 4½" insulation 3" glazed tile	7" walls of brick and insulation	4" firebrick 2½" insulation 2" glazed brick	4" firebrick 2½" insulation 2" glazed brick	4" firebrick 2½" insulation 2" glazed brick
Combustion and atmosphere control	Keith-Blackman	Keith-Blackman	Keith-Blackman	Needham	Needham	Keith-Blackman	Keith-Blackman
Temperature control	Bristol Indicator Manual	Recording pyrometer	Manual	Automatic	Automatic	Manual	Manual
Other features	None	Speed of conveyor mechanism controlled by Reeves variable speed control	Automatic feed	Reeves variable speed control	Reeves variable speed control	Reeves variable speed control on conveyor	Reeves variable speed control on conveyor
Is apparatus standard design or special	Standard	Standard design, special size	Standard	Standard	Standard	Standard	Standard
If so, give manufacturers' designation	86' plate conveyor type oven	Returning tray type traveling oven	110' automatic traveling oven	75' traveling hearth oven	80' traveling oven	110' traveling oven	75' traveling oven
Kind of gas and heat value	Mixture coke oven and carb. water gas, 535 B.t.u.	Carburetted water gas, 537 B.t.u.	Carburetted water gas 535 B.t.u.	Carburetted water gas 535 B.t.u.	Carburetted water gas 535 B.t.u.	Carburetted water gas 535 B.t.u.	Carburetted water gas 535 B.t.u.
Price per M cu.ft.	$.77	$1.00	$.972	$1.03	$1.03	$1.022	$1.0427
Price per 1,000,000 B.t.u.	$1.44	$1.86	$1.818	$1.928	$1.928	$1.91	$1.95
Cost of gas per unit of production	$0.000964 per lb.	$.0008	$.001525	$.00117	$.001465	$.00114	$.00102
Maximum cost at which business could probably be obtained:							
Per M cu.ft.	$1.00	———	$1.00	$1.03	$1.03	$1.022	$1.0427
Per 1,000,000 B.t.u.	$1.44	———	$1.818	$1.928	$1.928	$1.91	$1.95

QUESTIONNAIRE SUMMARIZED DATA LARGE VOLUME BAKING

Installation	*8*	*9*	*10*	*11*	*12*	*13*
Raw material (loaves)	1 lb., and 2 lbs.		Several kinds of weights	1½ lb. sandwich loaf	1 lb. to 3 lbs. 16 kinds and varieties	*Pretzels
Operating cycle and amount of work handled	13 hrs. 25,500 lbs.		13 hrs. 43,892 lbs.	5 hrs., 41 min. 16,824 lbs.	9 hrs., 23 min. 26,401 lbs.	400 lbs. per hr. maximum 300 lbs. per hr. minimum
Type of apparatus	Baker-Perkins	Baker-Perkins	Baker-Perkins	Baker-Perkins	Baker-Perkins	Continuous conveyor baking oven
Approximate Dimensions	85' l. x 9' w. x 6' 6" h.	100' l. x 6' w.	125' l. x 10' w. x 7½' h.	105' l. x 10' w. x 7½' h.	85' l. x 10'w x 7½' h.	Conveyor—4' w. x 50' l.
Refractory and insulation, kind and thickness	4" firebrick 2½" insulation 2" glazed brick	4½" firebrick 4½" insulation 4" glazed brick				8" refractory, 8" Sil-O-Cel brick
Combustion and atmosphere control	Therm-system Mechanical premixing and washing of air by a water filter		Gas pumped to 4 lbs. air inspirated at burner	Selas system with complete premix	Selas system with 2-1 premix	High pressure gas
Temperature control	Manual	Manual	Manual	Manual	Manual	Hand control
Other features	Variable speed control on converyor		Speed of conveyor controlled by Reeves variable speed control	Speed of conveyor variable by Lewellen variable speed transmission.	Oven drive by direct current variable speed motor belted direct to mill type speed reducer.	Pretzels delivered to oven conveyor on separate conveyor. This latter conveyor carries them through the boiling soda solution
Is apparatus standard design or special	Standard	Standard	Standard	Standard	Standard	Standard
If so, give manufacturers' designation	85' traveling oven	100' traveling oven	Conveyor oven. Iron hearth	Conveyor oven. Iron hearth	Conveyor oven. Iron hearth	Traveling oven
Kind of gas and heat value	Carburetted water gas 535 B.t.u.	Manufactured gas—500 B.t.u. 535 B.t.u.	Manufactured mixed water and coal—530 B.t.u.	Manufactured mixed water and coal—530 B.t.u.	Manufactured mixed water and coal—530 B.t.u.	Manufactured mixed water and coal—537 B.t.u.
Price per M cu.ft	$1.065	$.60	$.645	$.66	$.665	Average 63 c. per M on two part rate
Price per 1,000,000 B.t.u.	$1.99	$1.20	$1.218	$1.245	$1.255	$1.17
Cost of gas per unit of production	$.00113	$.00060	$0.000755 per pound bread	$0.000615 per pound bread	$0.00625 per lb. bread	46c. per 100 lbs. pretzels
Maximum cost at which business could probably be obtained:						
Per M cu.ft.	$1.065	———	In excess of $1.50 per M cu.ft.	In excess of $1.50 per M cu.ft.	In excess of $1.50 per M cu.ft.	
Per 1,000,000 B.t.u.	$1.99	$1.20	In excess of $2.83 per M B.t.u.	In excess of $2.83 per M B.t.u.	In excess of $2.83 per M B.t.u.	

* In this case the operation is that of pretzel baking and not bread baking.

electricity at a cost almost identical with that of gas when applied to ovens of older and less efficient design. This has kept the baking cost with gas at a higher level than it should be. Newer gas heated ovens have reduced the B.t.u. demand per lb. of bread. In the determination of rates the volume and characteristics of this extremely inviting load should be considered.

"The importance of finding small differences in cost that will operate to the advantage of gas is apparent if considered in connection with a traveling oven which produces 3,000 lbs. of bread per hour. Such an oven operating 16 hrs. per day, in 300 days will produce 14,400,000 lbs. of bread. A change of .001 of a cent per lb. will increase the profit on this one oven to the extent of $1,440 per year, and .002 of a cent would pay the yearly wage of an additional oven attendant. It is the duty of the local gas company to furnish such supervision and engineering advice as will make sure that all possible economies are secured. .

"The traveling oven uses high-pressure gas which, as usually applied today, requires gas compressors to be installed by the bakeries. The pressure used ranges from 1½ to 3½ lbs. per sq. in. The upkeep and difficulties encountered with these boosters could be obviated if it were possible to supply high-pressure gas directly from gas company mains.

"The foregoing tabulation is a summary of information collected on the subject."

Industrial Gas Advertising

Mr. J. F. Weedon, Chairman of the Advertising Committee of the Industrial Section, and also Advertising Manager of The Peoples Gas Light and Coke Company, reported on the activities of his Committee for the past year and its intended program for the coming year. The amount of money appropriated for advertising industrial gas nationally during the current year was $35,000, with an additional allowance of $2,500 for the compilation of an Industrial Gas Book for distribution to prospects and others who are interested in the subject. The Committee was able to purchase space in twenty-nine publications, twenty-one of which were trade papers, six—college papers, one—a restaurant publication, and another, a publication of general interest. It is believed that the Committee is getting as good a coverage out of these magazines as it is possible to get with the amount of money at its disposal.

During the year the Advertising Committee prepared the book previously mentioned, entitled "Industrial Gas Heat." This book gives a brief outline of many modern industrial gas heating operations in all lines of industry. It contains pictures of installations collected from different sections of the country, and a short account of heat treating requirements of the various operations.

The Advertising Committee anticipates expanding its activities to take in a great number of publications and otherwise enlarge its advertising activities. At the present time, in order to minimize mechanical costs, it is necessary to use general copy in all of the mediums carrying industrial gas advertising. This cannot but reduce the effectiveness of advertising in fields where it is known that specific copy would be more advantageous. It is hoped that this year's appropriation will be large enough to cover expansion to more specific advertising.

Paper by Stripe

Mr. Weedon's report was followed by a very excellent paper by Mr. W. C. Stripe of the International Combustion Engineering Corporation of New York, entitled: "Means and Methods the Gas Industry Should Employ to Secure Recognition from Manufacturers Using Fuel." Mr. Stripe's paper was well received and we think it worth while to repeat the text around which his paper was written.

First of all Mr. Stripe claimed that the securing of recognition for industrial gas is essentially a matter of education. He furthermore said that general nation-wide education of Industry as a whole is imperative. This phase of the work, he believes, is properly a co-operative function and from this we would infer that no one gas company alone can accomplish this valuable work. It is a responsibility which the Association cannot avoid. We like these words—they are fine—and we trust the Industry as a whole will take them to heart.

Secondly, Mr. Stripe said that local, specific education directed to particular geographic groups of prospective customer and to individual manufacturers was essential, and it was this type of work that should be assigned to the local gas companies under Association guidance. In concluding, Mr. Stripe emphasized the fact that publicity is the logical medium for effecting educational work both national and local that would be resorted to eventually, if not at the present time, in order to expand the Industrial Gas Business in this country.

Mr. Stripe quoted the annual advertising appropriations made by other associations; we take pleasure in reproducing them below:

Associated Tile Manufacturers	$ 125,000
California Fruit Growers Exchange	1,000,000
California Redwood Association	125,000
Canners League of California	318,000
Cast Iron Pipe Research Association	95,000
Engraved Stationery Mfg. Assn.	250,000
Evaporated Milk Association	400,000
Laundry Owners National Assn.	712,000
National Assn. Ice Industries	300,000
National Electric Light Assn.	100,000
National Lumber Mfg's Assn.	1,000,000
National Paving Brick Mfg. Assn.	125,000
Photographers' Assn. of America	500,000
Plumbing and Heating Industries Bureau	125,000
Portland Cement Assn.	500,000
Society American Florists	2,000,000
Southern Cypress Mfg. Assn.	250,000
Southern Pine Assn.	225,000
American Gas Association	35,000

It is hardly necessary to add any remarks to the story told by the above tabulation of Association expenditures.

Competitive Fuels

Mr. W. E. Miller of the Public Service Company of Northern Illinois, acting as Chairman of the Committee on Competitive Fuels, presented a report which

is filled with new ideas and new enthusiasm regarding the Industrial Business. Mr. Miller said that the scope of the Committee's activities had been to act in the capacity of a detective for locating new or existing competition of fuels other than gas. He stated that the duties of the Committee had been three-fold:

1. To acquaint the industrial engineer with new or competitive fuel applications.
2. To acquaint manufacturers with competing fuel applications in order to stimulate initiative in gas equipment development.
3. To suggest methods of gas applications which are successful in competition with other fuels on similar processes.

Natural Gas Represented

Mr. Miller showed very great wisdom, it is believed, in including in the personnel of his committee a large number of representatives from the natural gas fields, but it is believed that in the future, Industrial Gas Sectional Committees should include an equal number of natural gas men and manufactured gas men.

He spoke of the trend in the use of competitive fuels and said that due to the advance made in furnace design and knowledge along the lines of handling fuels other than gas, we could look forward to greater sales resistance to industrial gas in the future. He also spoke of the rather extensive development of the practice of shipping gas in tanks. For example, in Detroit there were certain installations to which butane is delivered in tank cars from which it is pumped to vaporizers. The gas vapor is then metered and delivered to a furnace equipped with standard city gas burners. The results of tests on this specific installation indicated a unit fuel consumption on city gas of 1.75 cu. ft. per net pound of product. On the basis of 32 cu. ft. of butane gas per gallon, butane gas at 10.5 cents per gallon can compete with 530 B.t.u. city gas at 60 cents per M. cu. ft.

Once again, the outstanding feature of Mr. Miller's paper was the need for an extensive national advertising campaign supported by the various gas companies.

Contact With Furnace Manufacturers

Mr. J. F. Quinn of the Brooklyn Union Gas Company delivered a very good report of his Committee which is assigned to Progress and Contact with Furnace Manufacturers. One of the first, and by far the most important things that the Committee has attempted to do during the past year was to compile the data received and have it printed on 3-¾ x 6¾ forms rather than the 8-½ x 11 as previously done. The wisdom that directed Mr. Quinn and his Committee to make this change is to be commended.

The entire committee was of the opinion that the data sheets in this form would be of more service to the field engineer, though it was agreed that a new classification index would have to be prepared. One hundred and twenty-five data sheets have been received from members throughout the United States and of this number 72 have been printed covering a variety of industrial gas users.

Where Do We Stand?

Mr. D. W. Chapman of The Peoples Gas Light and Coke Company delivered the first paper of the last session of the Industrial Section. His paper was entitled "What is Our Position in the Competitive Fuel Field?" In his opening remarks he said that he had given the subject considerable thought and had arrived at the conclusion that with the single exception of the Equator, nothing was more centrally located than the gas business with respect to the price of its product. "Beneath us we have the crude fuels, battling on the price basis; above us we have electricity crusading with the cry, 'Quality regardless of price.' To the right is the producer-man who shows our customers how to make their own, and to the left is the crew who go one better and deliver it to them in bottles.

"In spite of the crowds, however, if the Gas Industry will follow the example to be set by Mr. Coolidge 'next spring and do a little bit of 'whittling,' there will be plenty of elbow-room in our central location.'"

In another section of Mr. Chapman's paper is pointed out that in selling gas for industrial purposes the logical procedure requires:

First — *That we obtain* utilization equipment capable of turning out a superior product at the highest possible over-all efficiency.

Second — *That we offer* the lowest selling price for gas that will enable the utility to properly discharge its duties to the public, its stockholders, and its employees.

Third — *That we prove* to our prospective customers that the values which they are to receive at our hands cannot be equalled elsewhere.

Equipment Must be Improved

In closing Mr. Chapman said that he had no hesitancy in stating that in order to hold our present position in the center of the competitive fuel field and to rapidly expand our territory, we must continue to improve utilization equipment, periodically revive industrial rate schedules, and add to the convincingness of our sales policies. We trust Mr. Chapman means the enlargement of the National Advertising Campaign.

A Mutually Profitable Work

The Industrial use of gas throws us into quite intimate contact with a great many industries. Such industries must furnish the outlet for a great amount of gas that we hope to market for use in assisting in turning out their various products. As a consequence these industries must be cultivated and from time to time we must exhibit at their meetings and conventions, thereby getting across the Industrial Gas story to the end that the industries in question as well as ourselves will profit.

Mr. D. W. Chapman of The Peoples Gas Light and Coke Company, in his report on Display and Contact with National Industrial Organizations, gave vent to the following interesting observations:

"At the direction of the Management Committee of the Industrial Section, the Committee on Display and Contact with National Industrial Organizations for the past two years has devoted the major portion of its

effort to the task of securing a creditable display of gas equipment at the Annual Exposition of the American Society for Steel Treating. It has been customary, therefore, for the report of this Committee to feature the results that have been obtained each year through the co-operation of the American Gas Association with the American Society for Steel Treating, and to contain statistics showing the attendance, space occupied, number of furnaces displayed, and names of manufacturers participating in this project.

"This year the Annual Conventions of the two Associations are in session concurrently, which makes it impossible to present at this meeting the facts and figures which are essential to determine the effectiveness of the work of our Committee in that direction. It has, therefore, been thought advisable to make only a preliminary report at this time, and to supplement it later with a second chapter which can be made available to all who are interested through the columns of the American Gas Association Monthly.

"Under the sponsorship of the Committee, the American Gas Association subscribed for and fitted up a booth at the Exhibit held in conjunction with the meeting of the American Ceramic Society at Atlantic City in February of this year. The Exhibit consisted of products of the Koken Company, St. Louis, which had been enameled in gas-fired furnaces without muffles, together with vitreous enamel thermometers manufactured by the American Thermometer Company of St. Louis.

USE OF OIL PAINTINGS

"The attractiveness of the booth was materially enhanced through the use of oil paintings furnished by the American Gas Association. Our Committee desires to thank Mr. C. G. Segeler of our Headquarter Staff, Mr. J. P. Leinroth, and those who assisted them, for the interest which was displayed in making this exhibit possible and for the effectiveness which was secured with a negligible expenditure of Association funds. It is thought that the results obtained from this work justifies further exhibits at the Ceramic Society's meetings and this subject is recommended for the consideration of the Committee which will have this work in hand during the coming year.

"At the Industrial Advertisers Association Convention held in St. Louis during the early part of June, the American Gas Association's advertising display was shown. This Exhibit consisted of three panels, each 32" x 72". The first panel pictured work accomplished by Mr. J. B. Nealey, who has been writing for the Publicity Committee of the Industrial Section. The second showed typical examples of the advertising copy put out by our Advertising Committee, together with covers of the magazine in which the advertising has appeared. The third panel illustrated the forms of direct-by-mail advertising that have been used by the Industrial Section.

"The Committee has completed arrangements for the Exhibit which is now on display at the Commercial Museum in Philadelphia. The American Gas Furnace, Eclipse Fuel Engineering, Surface Combustion, Kemp Manufacturing, Sullivan Machinery and several other companies are co-operating to make the display this year surpass anything which has previously been done in an exposition of this kind."

COLLAPSING STRENGTH OF PIPES AND TUBES

We sometimes want to know the safe strength of a pipe or tube in resisting collapse. Here is a first class rule for all ordinary pipes where the pressure is less than 580 lb. per sq. inch and where the thickness in inches divided by the outside diameter in inches, is less than .023:—

Square the thickness of the metal in inches, multiply by 1600, divide by the square of the diameter of the tube in inches, subtract the quotient from one (1) and then extract the square root of the difference. (This square root will always be less than one, of course. Thus if the difference is 0.64 the square root will be 0.8.) Next subtract the square root from one (1) and multiply the remainder by 1,000. The result is the collapsing pressure in pounds per square inch.

For large sheet metal ventilating pipe—14 to 22 gauge inclusive—use 500 instead of 1,000 and the above rule holds.

Where the pressure is greater than 580 lb. and the thickness divided by diameter is greater than .023, use this rule:—

Multiply the thickness in inches by 86,670; divide by the outside diameter in inches, and from the quotient subtract 1386. The result is the collapsing pressure in pounds per sq. inch.

BETTER PUBLIC RELATIONS ADVOCATED

The cultivation of better public relations as a major activity for trade associations executives has been advocated by Dr. Hugh P. Baker, manager of the Trade Association Department of the Chamber of Commerce of the United States.

In an address before the annual convention of the American Trade Association Executives, Dr. Baker pointed out that the public has little or no conception of the constructive work in the public interest being carried on by industries through their trade associations and consequently the public is sometimes antagonistic to trade association effort.

"Many of the great corporations of the country," he said, "have come to appreciate the fundamental necessity of having right relations with the public. Specialists of various kinds are in the employment of these corporations to promote this work. Here is a legitimate function which might properly be undertaken by the trade associations of the country, even in industries where corporations are now spending large sums of money for the development of better public relations.

"There are many ways by which a trade association executive can carry on activities that would not only sell his association to the members but to that particular section of the public which the industry is trying to reach. It would seem at times that some associations have literally built a fence around their activities and feel themselves too busy to pay any attention to anything outside the fence or in fact to appreciate that there is a world of importance to them beyond the limitations of the fence which they have erected. There have been cases where the fence has fallen in and both the manager and his association have been crushed out of existence."

Part III—Technical High Lights

Engineering Trends

Excerpts from Address of Chairman W. C. Beckjord

IT is always worth while to know in which direction the industry is going. Chairman Beckjord charts the technical course in several important particulars of universal interest.

"In an industry of the magnitude of the gas industry it is not advisable to attempt to change everything overnight or too often. Change does not necessarily mean progress but certainly if we are going to keep up with the procession we must be constantly on the lookout for new ideas. . . . It takes a peculiar attitude of mind to be a research engineer. It involves unalterable determination to search for the truth. . . . There must be courage to go ahead with new ideas and work them out in actual practice.

"There has been a growing tendency toward outdoor construction and it would seem that this should be carried on to an even greater extent than ever before if the ratio of investment to gross earnings is to be reduced still further. . . . There is always a possibility of developing a new form of gas to distribute. . . . There has been installed at Grand Rapids, Michigan, a dehydration plant which has been in operation only a short time but long enough to show that it will accomplish the results for which it was designed.

"If too much peak load business is developed it will put the investment in plant out of balance with the net return. . . . The average capital turnover in the gas industry now is on the basis of 4 or 5 years, which puts a tremendous handicap on investment in the gas business. . . . It should be the engineer's constant thought and effort to get to the point where the investment can be reduced to at least half of what it now is, and perhaps less.

"Long distance transmission of gas is growing by leaps and bounds, not only in the natural gas field but in the manufactured gas territory in the north, and due to this growth the question of pipe joints is increasingly important. . . . They are giving greater attention to market possibilities for coke and other by-products. There is no question but what this is the leading problem in the production of coal gas, particularly the sale of coke. . . . One of the important assignments of the economic survey committee to the water gas committee was that of low-gravity water gas and experimental work has been done at Philadelphia and Pontiac."

THE attention being given to the technical side of the Gas Industry has multiplied amazingly in the last few years and it is becoming increasingly recognized that the business of making and distributing gas requires engineering ability of a very high order.

In the manufacture of gas particularly, there is need for trained Chemical Engineers who will combine the will to work with the necessary imagination and foresight. The various meetings of the Technical Section at the American Gas Association Convention clearly demonstrates that the Industry numbers among its workers a full share of technical brains. But every effort should be made to see that the supply of technical man power is augmented as the needs arise. This demands that the Gas Industry in comparison with contemporary industries offer positions whose future will guarantee to the employee work that is at once attractive and remunerative. Without a continuing supply of such brains, the Industry cannot expect to realize upon the optimistic forecasts which were made at the recent Convention.

Economic and Engineering Survey

Special Committee Under H. E. Bates Reports Outstanding Trends and Problems

No other committee undertaking is of quite as great importance as is the Economic and Engineering Survey. This task is far from complete, but some of the developments to date can be accurately appraised from the following quotations taken from H. E. Bates' committee report.

"The Technical Section of the American Gas Association has for many years given a great amount of time and attention to the operating problems of the industry and has accomplished much in making possible lower costs of producing and distributing our product—this in the face of rising prices of materials and labor. Only within recent years, however, has much attention been given to a problem of equal importance—that of fixed charges. The characteristics of our customers' demands limit the use of a large part of our investment. The resulting high fixed charges make it just as important to obtain the maximum amount of use of every dollar invested as it is to produce and distribute our product at the lowest possible cost.

"For this reason, the Engineering and Economic Committee believes it advisable to apply its initial efforts to studying ways and means of reducing the fixed charges on our investment, rather than operating costs, which have been and are still being given considerable study through other agencies.

Uniformity Essential

"It is recognized that adequate service requires that the finished product be uniform in heating value and fairly constant in specific gravity. Of these two, to keep the gravity variation within reasonable limits is the more difficult. The gas used for peak and variable loads usually has a higher gravity than the gas used for the base supply. This is especially true of water gas where used as a mixture with coal gas or natural gas. Where oil gas is used for the variable supply, the difference in gravity is not so great since the gravity of oil gas is very close to that of coal gas. The most important factor in this problem of mixing gases is the amount of variation in gravity which is allowable without affecting the quality of service which the finished product gives in the appliance.

Advantage of Low Gravity

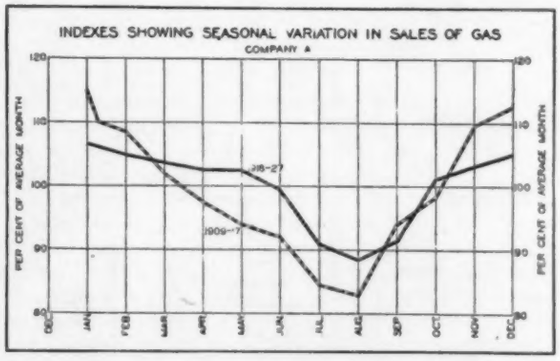
"There are many advantages in producing and distributing a mixture which has as light a specific gravity as possible. The capacity of most distribution equipment is materially increased as the gravity of the gas passing through is reduced. The relative capacity of pipe lines for different gravities is shown by the following table:

Specific Gravity	*Capacity Ratio*
.70	1.000
.65	1.037
.60	1.081
.55	1.128
.50	1.184
.45	1.248
.40	1.323

"Since the larger portion of any company's investment is in mains and services, the distribution of gas which has the lightest possible gravity will result in a very substantial saving in investment.

Off-Peak Use of Equipment

"If ways and means can be developed to use this idle equipment for the manufacture of other products than gas, and if such products can be marketed at a price above the actual cost of manufacture, the margin of profit would tend to reduce the fixed charges. Even a comparatively small margin of profit would be of important advantage.



"This would apply especially to the use of water gas equipment. The production of water gas is a chemical process, and it is quite possible to utilize water gas equipment to make other products of a chemical nature.

"While market conditions at the present time are unfavorable for profits for anything so far produced with idle equipment, it is hoped that changes in the market and further study and research may produce means of obtaining this additional revenue. The committee has assigned this problem to the Chemical Committee.

Distribution Capacity

"More than 60% of the total investment in the gas industry is represented by distribution equipment which is used to its capacity less than 40% of the time. In spite of a considerable industrial load with a very favorable load factor which the gas industry is developing, the requirements of the domestic consumers are tending to increase the maximum hour's demands to such an extent as to prevent any improvements in the hourly load factor. The engineer must, therefore, find ways and means of making his present distribution system handle additional loads and, when necessary, must install additional equipment at the lowest possible cost per unit of capacity.

Long-Distance Pumping

"Present distribution practice indicates a trend toward greater distances for gas transmission than was formerly considered practicable. There is no doubt but that this practice will develop further in future years. The natural gas industry has long recognized the economies of long-distance transmission of gas, but it is only recently that the manufactured gas industry has followed such practice.

"It is true that natural gas can profitably be transmitted greater distances than manufactured gas. There is reason to believe, however, that the manufactured gas industry can economically transmit gas greater distances than was formerly considered good practice. Several large companies have connected their various cities and towns with transmission systems and are supplying them from one or more central points. In such cases the gas is being transmitted as far as 100 miles or more.

Unaccounted-for Gas

"Statistics indicate that the annual loss, due to unaccounted-for gas, to the manufactured gas industry alone amounts to more than $10,000,000.

"Part of this is due to leakage, part of it is due to condensation losses, and some of it is due to incorrect metering. The problem of leakage belongs to the distribution engineer and the problem of condensible belongs to the production engineer.

"A loss of this magnitude deserves the attention of the industry. More accurate information should be available as to the various factors contributing to unaccounted-for gas, and it is hoped that more effective means of overcoming this economic loss will be developed during the coming year.

"It is very gratifying to know that the statement made a year or so ago to the effect that 'the real competition in which the gas industry is involved is that between research and tradition' is becoming less and less true."

Carbonization Report

Report of Committee and Sub-Committees Under H. H. Himsworth, Chairman

The desirable characteristics of coke, both chemical and physical, and effective methods for preparation, storage, merchandizing, and sampling, together with important statistics on this branch of the gas industry, are summarized in the coke section of this report. Most of the material so contributed represents the revised papers with discussion from the Production Conference held in Rochester during May, 1928. That conference was fully reported in *American Gas Journal* for June, and need not be again reviewed here. It is, however, a matter of satisfaction that the industry now has available in full the outstanding papers and discussions from that conference. The merit of those contributions more than justifies the use of so large a por-

tion of the annual convention committee report for their recording.

Plant Operating Tests

Operating problems presented by the committee included a discussion of producer gas generation and of producer gas versus blue gas for heating carbonizing units. These subjects are worthy of special study by every plant operator who wishes to cut his heating fuel costs to a minimum. Some outstanding features are reviewed briefly below.

Similar attention is deserved for the final review of the work done under the direction of the Carbonization Committee during the past five years on full-scale plant tests of four carbonizing units. The final summaries and plant comparisons again stress the fact that certain types of carbonizing plants have intrinsic advantage for certain economic conditions and others are better suited to other localities. These operating tests are, therefore, worthy of study primarily as a basis of determining how the type of carbonizing plant is likely to affect gas yield, by-product recovery, and coke quality and quantity. The local management is thus somewhat aided in determining which type of plant is likely to have for his local condition the greatest over-all financial advantage. The report printed in this year's annual proceedings includes the major discussion of this subject which took place at Rochester in the course of the Production Conference, as well as some additional material pertinent to the general theme.

Gas Producer Operation

Papers of Fred Denig and Fred Pfluke

"The principal problem confronting both designer and operator is to prevent segregation of coke when mixed sizes of coke are used. This segregation takes place in both bin and the producer. Two new novel methods of feeding fuel to the Kerpely producer have been designed; one of them is in operation and the other design will be tried out shortly.

Rochester Experience

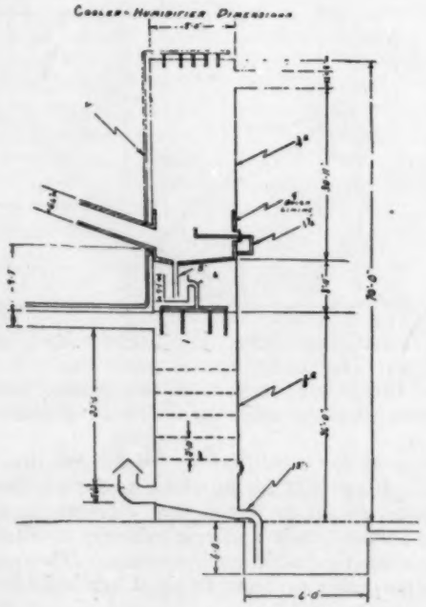
"The methods of producer operation pursued at Rochester are the results of 11 years' experience. This practice was evolved after considerable experimentation and has resulted in economical and very satisfactory heating both for the U. G. I. vertical retorts, now out of service, and the new Koppers ovens which have been in operation for over two years. It is hoped that this paper may be of some value as a guide to the newer producer operators and may aid them in avoiding some of the difficulties usually experienced in operating new and unfamiliar equipment.

"When it was desired to use the old producers in conjunction with the new producers for oven heating which requires cold gas, the problem presented itself as to how to cool the gas cheaply and recover the heat. This problem was solved by installing a humidifier cooler.

"The humidifier-cooler mentioned before consists of a steel tower built in two sections as shown in Figs. 3 and 4. Through the upper section or gas cooler, hot producer gas is passed counter current to cold water which is pumped into the top through Sprayco nozzles. The gas is thus cooled to 130° F. at which temperature it is equivalent in heat content to the dry gas leaving the Koppers producers waste heat boilers at 400° F. The water leaves the cooler tower at 150° F. and flows into the lower or humidifier section through sprays. Air is drawn through this section of the tower from the outside by the primary air blower and is heated and saturated by the warm water. This single tower of 8′ diameter and total height of 70′ will cool the output of 3 producers to 130° F., saturate and heat to 120° F. the air necessary to blast these producers when operating at one ton of fuel per hour rate. The additional heat necessary to bring the saturation temperature up to 142° F. is supplied by low-pressure steam.

"The humidifier cooler requires no attention with the exception of cleaning seals and valve strainers once a shift and oiling the water pump. There is no maintenance with the exception of cleaning sprays three times per year.

"There was one danger which seemed quite serious when the humidifier cooler was put into operation. Since the cooler tower is not lined, except at the gas inlet, and the outlet gas line from the cooler is unlined, serious consequences might follow a failure of the water circulating pump, in which case 1100° F. gas would be flowing through the tower. This obstacle was overcome in an ingenious and interesting manner. Four standard automatic fire sprinkler connections were installed in the top of the cooler tower and were connected to the city water system. In case the pump fails the low melting point caps on the sprinkler connections will melt when the gas temperature reaches 280° F. and the water will flow through the connections into the tower, thus cooling the gas.



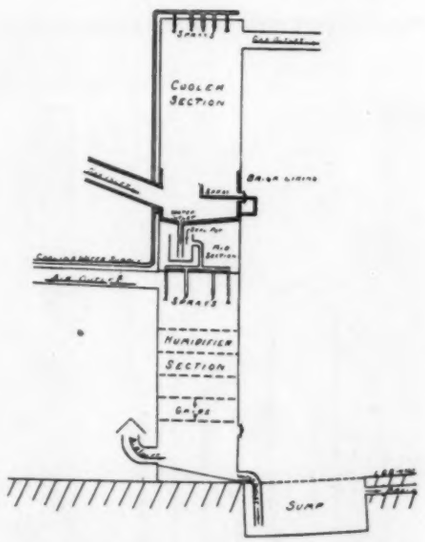
"The sprinklers have had occasion to function several times and each time have performed perfectly.

"The total maintenance cost including painting will not exceed $1 per day. It is interesting to compare the cost of heat recovery by means of waste heat boilers and humidifier coolers.

"In this set-up the value for therms recovered in the waste heat boilers was obtained from a heat balance run on the boilers. This heat balance showed that

89.7% of the sensible heat of the gas given up to the boilers is recovered in steam. A heat balance has been run on the humidifier cooler but the calculations are not yet completed. However, it is evident from figures obtained that the efficiency of this outfit will not be as great as the waste heat boilers. It seems reasonable that 50% of the heat removed by the humidifier cooler is recovered in saturating the primary air and this has been used in the above set-up.

PRODUCER GAS COOLER-HUMIDIFIER



"No charge except pumping cost has been made for the cooling water used in the humidifier cooler, as our water is obtained from the river. The total water used amounts to 6,300 cu. ft. per producer per day.

"To summarize briefly, assuming 50% recovery in the humidifier cooler, there is a saving of $.025 per therm recovered with the cooler compared to the cost of recovering heat in the boilers. The total operating cost of the boilers is only $.002 per therm less than the heat is worth while there is a profit of $.027 per therm with the humidifier cooler, or $2,051 per prod, per year. In order to bring the cost per therm recovered in the two systems to the same level the recovery in the humidifier cooler would have to be 20%.

	Waste Heat Boiler	*Humidifier Cooler*
Capital Cost	$75,116.00	$20,000.00
Fixed Charges at .36	$ 10.97 Per Prod./day	$ 2.92 Per Prod./day
Maintenance Based on 1 yr. Operation	$ 4.46 Per Prod./day	$ .33 Per Prod./day
Water at $.0060/M cu.ft.	$ .31 Per Prod./day	$ 0
Elec. Power Cost at $.01/kw.hr. 100 × .01		$ .33 Per Prod./day
Steam Power Cost at $.50/M lbs.	$ 1.66 Per Prod./day	
Total Operating Cost	$ 17.40 Per Prod./day	$ 3.58 Per Prod./day
Therms Recovered	432 Therms Per Prod./day	240 Therms Per Prod./day
Cost per Therm	$ .040/Therm	$ .015/Therm
Value of Therms Recovered at $.50/M lbs. of steam	$ .042/Therm	$ .042/Therm
Profit	+ .002/Therm	+ .027/Therm
Profit per Prod.	$ .867 Per Prod./day	$ 6.38 Per Prod./day
Fuel Gasified	24 tons/day/Prod.	24 tons/day/Prod.
Gain Due to Humidifier Cooler	$5.62/Prod./day or	$2,051.00/Prod./Year

"In addition to the saving affected by the cooler there is the further advantage, which to us is the greatest, that the cooler is simple and has no accessories to get out of order while a boiler has a large amount of piping to keep free of leaks and requires considerable attention. It has been found necessary at Rochester to cut a producer off the line a number of times due to boiler troubles. No trouble whatever has been experienced with the humidifier cooler.

Dry Producer Fuel

"Since installing a dry quencher it has been possible to obtain dry producer fuel. Actually absolutely dry fuel is not used since the coke is wet down on being discharged from the dry quencher in order to 'lay the dust.' However, the moisture is kept between 2% and 5% and the benefits are very marked.

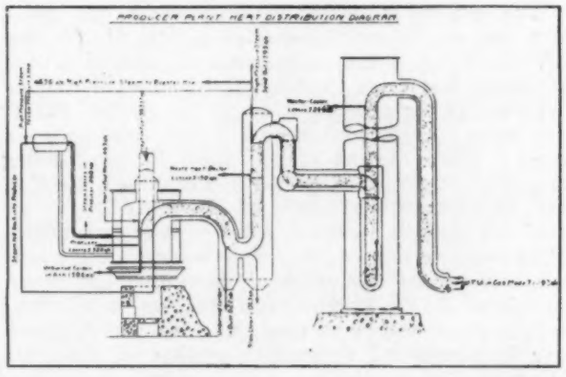
"Using wet quenched coke, it is necessary to use fuel through a 1¼" screen. It is also necessary to screen out a portion of the fuel through ⅝" due to a large amount of fines adhering to the larger coke. A large percentage of high-moisture fines results in heavy fires and makes necessary high blast pressures resulting in channeling and clinker formation. When dry fuel is used it may all be through a ⅞". screen and it is necessary to screen out only the dust through a 3/16" or ⅛" screen and this only because it blows over. Hence a large percentage of saleable coke between 1¼" and ⅞" is saved and nothing is lost except dust through ⅛" screen which is sold for boiler fuel.

"The comparative operating results with dry-quenched and wet-quenched fuel shows that 6.3 pounds more wet fuel is required per ton of coal carbonized. This excess is greater than corresponds to the theoretical requirement for heat of vaporization and sensible heat of the moisture itself, implying indirect operating efficiencies due to better combustion performance of the dry-quenched coke."

Chicago Producer Results

The Heat Balance and Special Maintenance Provisions Reported

The heat balance on Koppers Kerpely center-feed producers which was run during September and October last year is based on operation with 70 per cent



clean nut coke and 30 per cent containing considerable breeze. The results of that operating test were presented by C. R. Locke and can best be summarized, as in the committee report, graphically and by complete tabulation computed to an average day basis.

HEAT BALANCE—OPERATING DATA

For the Period from September 16 to October 14, 1927, Computed to an Average Day

Fuel

Coal carbonized by producer gas ..... 2,120 tons Coke analysis: H_2O 8.80
Coke used ..... 261.80 tons V.M. 2.59
FC 87.05
Ash 10.36

B.t.u. per lb. dry 12,901
B.t.u. per lb. as fired 11,760
% carbon in producer ash 11.92
Average screen test:

On 1"	On ¾"	On ½"	On ⅜"	On ¼"	Through ⅛"
3.6	29.2	27.1	23.6	13.3	6.2

Gas

Gas made per day—saturated at 60°-30" ..... 37,750,110 cu.ft.
Gas analysis:

CO^2	O^2	CO	H^2	CH^4	N^2
6.64	0.36	24.89	12.79	0.4	54.92

B.t.u. per cu.ft.—saturated—127

Operating Conditions

Saturation temperature ..... 61.0° C.
Temperature of gas out of producer ..... 616.0° C.
Temperature of gas out of waste heat boilers ..... 250.0° C.
Temperature of gas out of scrubbers ..... 20.0° C.

Steam

Low-pressure steam made ..... 245,890 lbs.
High-pressure steam made ..... 377,400 lbs.
Blow down losses ..... 12,000 lbs.
Total feed water to low-pressure jackets ..... 635,290 lbs.
Temperature of feed water to low-pressure jackets ..... 45° C.
Temperature of feed water to waste heat boilers ..... 110° C.

Summary (Base 60° F.)
Heat in

	B.t.u.	%
Heat in coke	6,160,557,200	99.537
Feed water to low-pressure jacket	33,670,400	.463
Total heat in	6,194,227,600	100.000

Summary *Heat Balance*
(Base 60° F.)
Heat Out

	B.t.u.	%
Utilized: Calorific value of gas	4,794,264,000	77.399
H.p. steam send-out	98,699,800	1.593
H.p. steam to equipment	288,385,200	4.656
Sensible heat of gas	5,709,600	.092
Sensible heat of moisture in gas	138,900	.002
Total	5,187,197,500	83.742
Losses		
Carbon in ash	98,112,000	1.586
Carbon in dust	38,544,000	.622
Producer losses:		
(a) Steam	4,116,200	.068
(b) Radiation and unaccounted	342,120,400	5.520
Waste heat boilers:		
(a) Blow downs	3,912,000	0.063
(b) Radiation and unaccounted	195,129,900	3.150
Cooler absorbtion and radiation	325,095,700	5.249
Total losses	1,007,030,000	16.258
Total heat out	6,194,227,600	100.000

Producer Maintenance

"The general procedure adapted in this plant for the care of the producers consists of a general overhauling of each machine once in every six months. At this time, the producer is cleaned out and every piece of auxiliary apparatus carefully inspected and overhauled. By keeping the machines on this schedule, breakdowns which would necessitate taking the machine off the make while under load, have been largely eliminated.

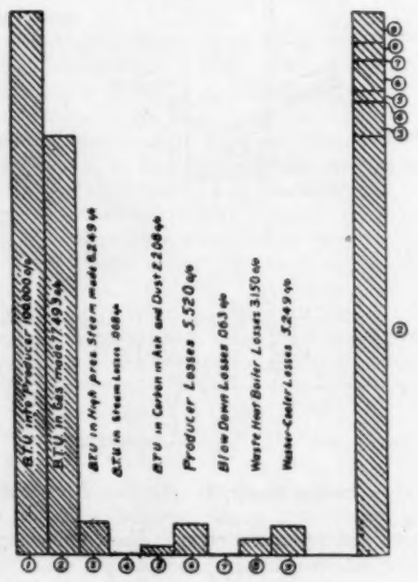
"The grates, as originally installed in this plant, were cast in one piece and have a total of 869 one-half-inch holes, giving a total area of holes of 170 sq. in. With this grate capacity as high as 50 tons of fuel per day, or approximately 53 lbs. per sq. ft. per hour when operating on clean nut fuel, have been obtained. When the machine is down for overhauling the grate is carefully inspected and each hole punched out. If, at this time, any marked signs of wear are noted the grate is loosened from its base and turned 90° in the direction of rotation. Wear on the grates invariably occurs to a marked degree on the eccentric side where the grinding and breaking up of clinkers take place, and by turning the grate this excessive wear is transferred to another portion of the grate surface.

"The average life of a grate under ordinary conditions is about two years without turning, but we feel that if the grate is turned 90° every time the machine is down for overhauling that at least a year and possibly longer will be added.

Grate Repair and Replacement

"When a grate has been considerably worn and is quite thin, its life can be considerably prolonged by bolting on a wearing strip with countersunk bolts. This strip does not follow the outline of the grate, but extends across the steps of the portion that is to be protected. The strip is perforated for air passage. This method usually adds some months of life to a grate, but cuts down the capacity of the machine because of the rapid plugging of the air holes.

PRODUCER PLANT DETAILED HEAT DISTRIBUTION CHART


BTU in Producer 1068.6 qs
BTU in Gas made 749.3 qs
BTU in High pres Steam made 8.249 qs
BTU in Steam Losses .088 qs
BTU in Carbon in Ash and Dust 2.208 qs
Producer Losses 5.520 qs
Blow Down Losses .063 qs
Waste Heat Boiler Losses 3.150 qs
Water-Cooler Losses 5.249 qs
1 2 3 4 5 6 7 8 9 10

"The changing of a grate is quite a task, involving either the dismantling of the bottom or top of the producer and, to avoid this trouble new grates were ordered which were cast in two pieces. It is now possible to install a grate by simply removing the fuel hopper which, of course, results in a large labor saving. The newer grates that have been installed have ⅝" holes instead of ½", and this feature greatly increases the capacity of the machine by cutting down the pressure drop across the grate. On test runs, a 10′ producer equipped with a grate having the large holes, has gasified clean nut coke at a rate of 73 tons per twenty-four hours or 78 lbs. per sq. ft. per hour."

Blue Gas vs. Producer Gas for Oven Heating

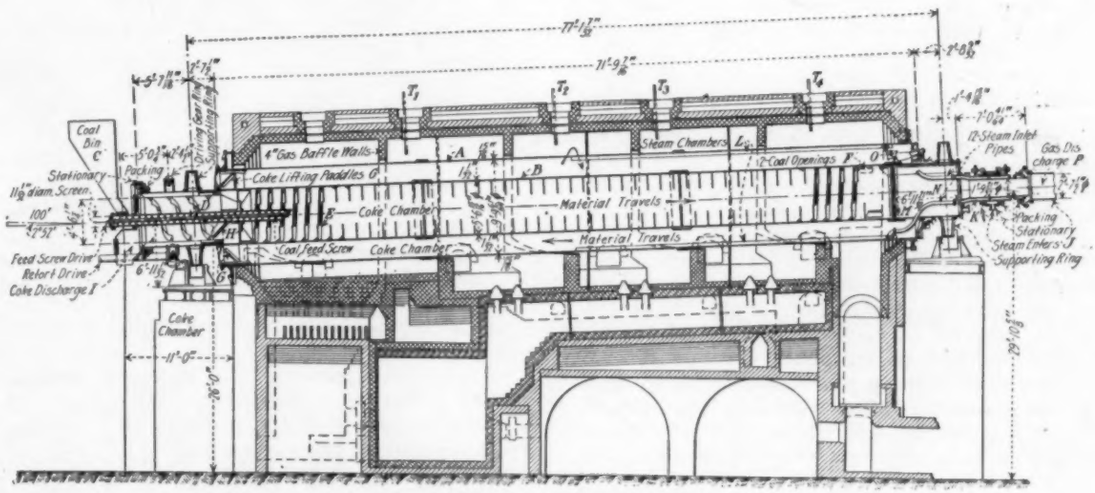
Influence of Improved Blue-Gas Equipment Discussed by F. J. Pfluke

There has been considerable debate during recent years as to whether the advantages demonstrated in 1922 for producer gas by Mr. Reed Morris still prevail in view of the improved blue-gas equipment and

operating methods now available. In spite of these improvements there is still a balance in favor of producer gas from an economic point of view, judging from the following data which are the best that it has been possible to obtain:

	Producer Gas	*Blue Gas*
Lbs. dry fuel to carbonize 1 ton coal	225	251
Lbs. carbon to carbonize 1 ton coal	199	222

The general conclusion drawn by Morris that occasionally a blue-gas plant has the advantage of affording stand-by capacity appears to be equally true today. The superiority of producer gas judged on the basis of its lower fuel cost should be tested by careful plant experiments, preferably on a carbonizing unit capable of using both kinds of gas. Such investigation should be of such scope as to include the combustion characteristics of the two gases, ease of control, and relative efficiencies.



General Arrangement of K.S.G. Retort

Low-Temperature Coking

Sub-Committee Report by Carl J. Wright, Chairman

The following resume gives an up-to-date understanding of the present economic status in the field of low-temperature coking.

"The status of low-temperature carbonization developments, both in the United States and abroad, has remained essentially unaltered during the past year. . . . In one case only, in the United States, have full-scale commercial developments actually been initiated, to wit the K. S. G. plant now under construction by the International Combustion Engineering Corporation.

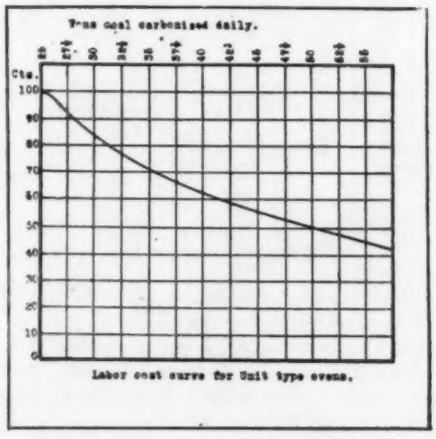
"In general there seems to be no concordant body of opinion in the United States as to the proper ultimate niche for low-temperature carbonization in our general scheme of fuel utilization. This uncertainty arises largely from the fact that we do not actually know the final large-scale market value of low-temperature tar as compared to coke-oven and other existing tars, or that of low-temperature semi-coke as compared to by-product coke on the one hand and anthracite coal on the other. In this respect we find ourselves caught in a vicious circle. These final values cannot possibly be established save by continued commercial scale operation, yet such operation cannot be projected or established on any sound financial basis unless these values are known."

The economic value and the technical application of low-temperature tar came in for some spirited discussion due to striking differences of opinion among those present.

Plant Builders' Reports

Erection Companies Describe Recent Developments

Among the numerous suggestions as to recent construction development the following are particularly



Labor cost curve for Unit type ovens.

significant for the average gas-works reader.

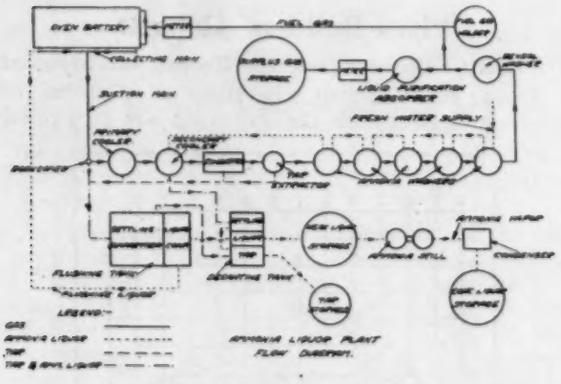
"The objective of the Improved Equipment Company in developing the unit oven was primarily to make

available—to the small coal-gas operators—a plant in which all of the advantages could be obtained that are now attainable in the large city oven plants.

"Another point of important consideration is that a very gradual plant capacity increase can be made at any time and at a very moderate expenditure of money, property and time. This is made possible in that the capacity of one oven unit will meet the normal increased capacities created by actual demand more readily than even a stop-end bench of retorts. One or a number of these units may be added to the existing battery with practically no interference to plant operations and without investing in overage or needless capacity.

Firing Ovens With Blast-Furnace Gas

"This close relationship between the gas industry and the commercial coke plant gives to the former an active interest in developments designed primarily for steel plants. For example, the application of blast furnace gas for under-firing coke ovens will make large volumes of gas available to the utilities. The Becker oven can be heated with equal efficiency with coal gas, blue gas, producer gas or blast furnace gas. At present, one of the batteries of 55 Becker ovens of the By-Products Coke Corporation, South Chicago, is being converted to blast furnace gas underfiring after three years of successful operation with coke oven gas underfiring. This change will release over five million cu. ft. of rich coke oven gas per day which will be sold to The Peoples Gas Light and Coke Company for distribution in Chicago. The new Becker oven plant of the Youngstown Sheet and Tube Company, South Chicago, will also use blast-furnace gas for underfiring. These are the first American plants to use blast-furnace gas for this purpose."

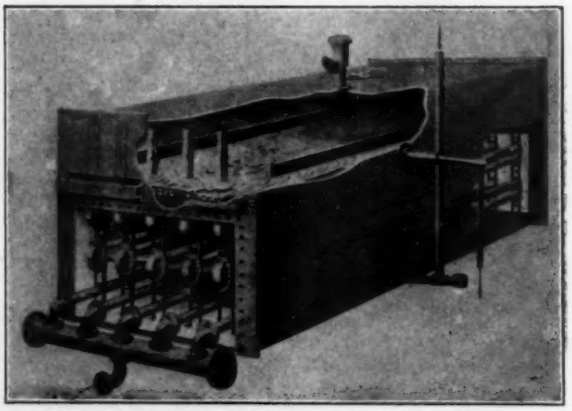


Indirect Ammonia Process—Michigan Alkali Company

The indirect-process ammonia plant of the Michigan Alkali Company was developed in order to recover all ammonia as concentrated liquor so that it would be in the desired form for further chemical uses. The flow sheet of this plant makes clear this interesting development.

Intermittent Chamber Verticals

The intermittent vertical of the Stettiner type introduced in the United States is represented already by three installations of the United Engineers and Constructors, Inc., who summarize the advantages of this new carbonization system as follows:



"Wikner" Patent Tar Dehydrator

"A gas oven designed for manufacture of gas with coke as a by-product.

High capacity per sq. ft. of ground space.

Low labor cost due to:

Simplicity of regulation.

No moving machinery except charging larry and hot coke car.

Production of domestic coke of highest quality.

Small amount of coke breeze made.

Low maintenance cost due to:

Low operating temperatures.

Practically no moving machinery.

Simple, uniform and easily regulated heating system.

Rugged construction.

Efficient operation due to:

Steaming giving dilution without addition of inerts.

Flexibility of operation with coal gas heating.

High gas yields.

High by-product yields.

No napthalene made."

Continuous Verticals Extended

All continuous verticals of the Glover-West type completed before 1921 have now been extended indicating a very high degree of satisfaction on the part of purchasers. One of the most recent plants of this system will be described in an early issue of *American Gas Journal*.

The new type of Wikner continuous tar dehydrator erected by this same company for the Springfield Gas Light Company is noted as a recent development of importance in by-product handling. This still has a capacity of 50 tons of crude tar per day.

"A description of a new type of continuous tar dehydrator will no doubt be of interest. The first installation of a Wikner tar dehydrator has been built for the Springfield Gas Light Company.

"The dehydration of tar in this still is carried out continuously. Crude tar enters the bottom of the tank, as shown in the accompanying figure, and overflows, after dehydration, at the surface level to the fired stills for further treatment when such is desired. A tar suitable, under certain circumstances, for road spraying can be obtained from the Wikner outlet. The limiting factors are the nature of the crude tar and the available steam pressure.

"The operation of the still is exceedingly simple. Heat is supplied by steam coils at the surface of the

tar only. The water vapor and naptha vapors thus driven off are collected in the vertical pipes shown in the figure and pass backwards and forwards through pipes entirely surrounded by comparatively cold incoming tar thus preheating this tar and at the same time condensing. The condensate and remaining vapors are collected in a common header and further cooled down in a water-cooled condenser."

Using Water-Gas Equipment for Off-Peak Periods

Special Chemical Sub-Committee Reports Describing Outlook

Even though no positive recommendations are yet forthcoming, it is worth while to know the limitations recognized in use of water-gas equipment during off-peak periods for chemical manufacturing.

This committee is a continuation of the 1927 committee with two additional members representing the water gas and carbonization committees. Last year the committee submitted a report[1] which gave figures for the capital investment for blue water gas plants and the extra capital investment required for the manufacture of ammonia and methanol.

1. The general situation for the use of off-peak water gas equipment for making ammonia, alcohols or hydrocarbons is somewhat more unfavorable than last year due to the plans of increased production by the large chemical companies. Furthermore, methanol and formaldehyde are likely to be reduced from natural gas at a lower figure than possible from water gas.

2. The abundant supply of petroleum shuts off any possible motor fuel market in the near future.

3. A possible chance for utilizing a synthetic process by gas companies is in the catalytic enrichment of water gas by the Fischer process. Research work along these lines may be justified at the present time since it would make gas companies independent of the petroleum industry. With increasing gasoline demand and decreasing petroleum supply, gas oil will be required as cracking stock for gasoline production. It is recommended that the Association foster an inquiry on the probable cost of synthetic enrichment of water gas, and a comparison of this cost with costs of carburetting with oil, in order to determine whether or not support by the Association of research on catalytic enrichment may be justified.

Propane Gas Enrichment

To show the economic possibilities of commercial propane and butane recovered from natural gasoline, R. W. Thomas and O. M. Setrum, of the Phillips Petroleum Company and the affiliated Philfuels Company, presented a report discussing the properties and the applicability of these hydrocarbons. The conclusions of these advocates of propane enrichment are:

"1. At the present extremely low-gas oil price levels, commercial butanes seem, on the basis of the meager data at present available, competitive at a common price per gallon for water gas enrichment.

"2. The new enricher will become of proportionately greater worth to the industry as the general price structure of enricher fractions ascends.

"3. Satisfactory and practical mechanical means for handling, mixing, and controlling liquefied petroleum gases in gas plants have been worked out and are available to the industry.

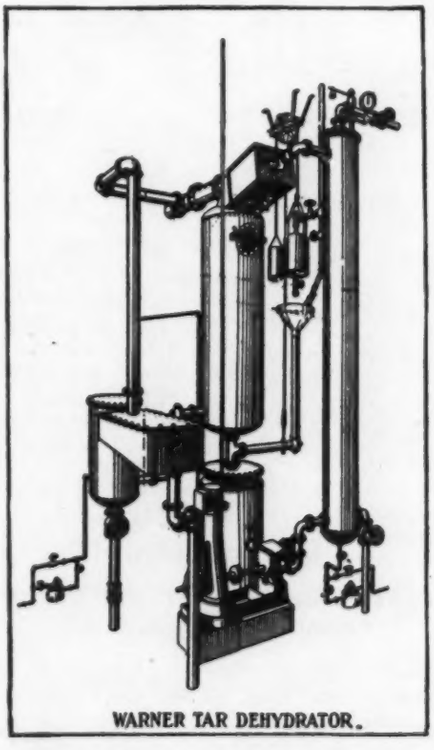
"4. The use of these recently available liquefied gases as the sole raw material for economical gas manufacture with consequent reduction in labor and production costs at small properties should be given serious consideration by the industry.

"5. The competitive nature and large available quantities of liquefied gases suitable for replacement of manufactured gas in large industrial uses creates a situation that can perhaps be solved only by the increasing use of these fuels by the gas utilities as enriching mediums, and in the complete manufacture of gas at properties having low send-outs."

Water-Gas Methods

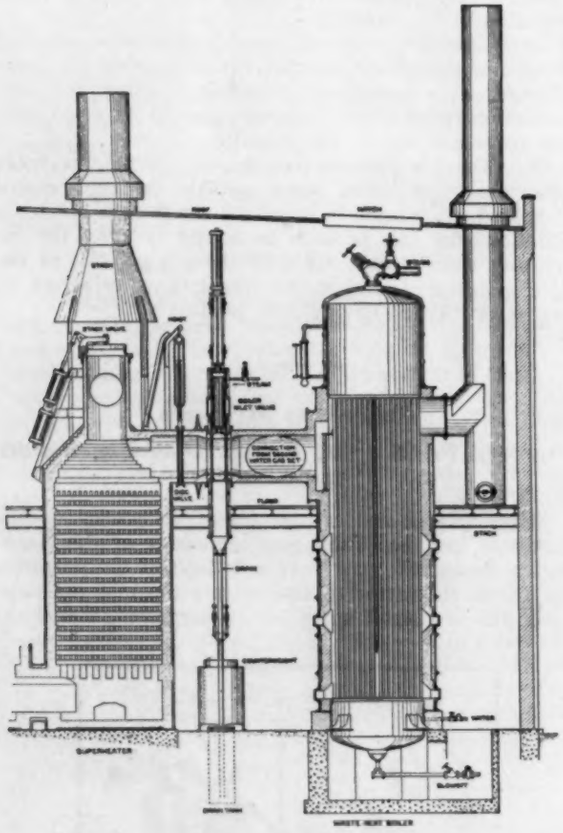
Improved Practice and Present Operating Results Described

When a large and capable committee works as diligently as has the Water-gas Committee of the Association during the past year it is beyond the possibilities of an abstractor to concentrate the material supplied within a small space. It is suggested, therefore, that the only way to realize adequately upon the meaty report of this committee is to get a copy and sit down and study it in detail personally. Results of automatic charging and automatic clinkering in Chicago,



WARNER TAR DEHYDRATOR.

Minneapolis, Pontiac, Baltimore, West Conshohocken, and elsewhere are reported in such detail that only by intensive study of the original complete paper can all the possible benefits be realized.



Gas Machinery Co. Waste Heat Boiler

A similar conclusion is drawn with respect to the paper describing a comprehensive survey of steam uses in the modern water-gas works, presented by W. J. Lutz and E. F. Weeks. Any abstract omitting paragraphs of that document would leave out vital considerations for the operating engineer. Among the other subjects capably covered by this committee are air-cooled linings, tar production and tar emulsions, and automatic mixing of gas with control of heating value.

Dehydration of Gas

Report of Committee Under F. W. Sperr Outlining Problems and Typical Costs

Whether or not dehydration of gas is to be practiced generally and soon, no one can at once forecast, but this measure for corrosion prevention and for improvement of gas-supply conditions is certainly going to find early application in a few localities. It is exceptionally important, therefore, to learn of the earliest city-wide test of this sort and to study the problems involved as described by F. W. Sperr and his committee associates.

"Through the interest and enterprise of the officials of the Grand Rapids Gas Light Company there has been installed the first plant for the dehydration of the entire gas supply of an American City. In this system the moisture is removed from the gas by means of a hygroscopic solution obtained as a by-product of liquid purification. In the liquid purification process all of the hydrocyanic acid in the gas is converted to sodium thiocyanate and it is this together with some sodium thiosulphate which is the active material in the hygroscopic solution. The gas leaving the oxide catch boxes is passed through a suitably packed scrubbing tower over which the hygroscopic liquor is circulated.

"After the dehydration operation the gas is sprayed with oil in such a way as to remove any entrained solution and at the same time to maintain some oil fog and vapor in the gas leaving the system. This practice is expected to keep the distribution system lubricated with a slight amount of oil so as to prevent dust formation and to seal minute leaks in joints or elsewhere that might otherwise result through the drying out of the system.

"The expense of gas dehydration irrespective of the system adopted depends upon the dew point required. The direct operating cost of dehydration will therefore be reduced by following the dew point required for different seasons of the year. It should be unnecessary to dehydrate further than 1 or 2 degrees below the minimum temperature of that part of the distribution system to be protected.

"In most cases it should be unnecessary to dehydrate to a dew point lower than 30° F. in the winter. In the exceptional cases the investment and operating cost of dehydrating below 30° F. to take care of special conditions would have to be balanced against the savings possible by complete elimination of freeze-ups. It is recommended that the subject of ground temperatures be studied from the special standpoint of gas dehydration and that this study be made the subject of a special report.

Design of Distribution System

"As this report is being written, the Grand Rapids gas dehydration plant has been in operation for only a short time. The operation has been very satisfactory from the outset. From such observations as could be made during this short period together with the cost studies which will be submitted later in this report, it can be confidently stated that the dehydration of gas can be readily and efficiently accomplished at a low cost in apparatus requiring very little labor or attention. The problem of accomplishing the inexpensive dehydration of gas may in fact be regarded as solved. The important thing now is to determine what effects are produced in the distribution and use of the dehydrated gas and what economies will result from this practice. This will require observations over a long period of time and the work that is being done at Grand Rapids should afford conclusive information.

"In most cases mains and services could be laid with less cover, thus effecting a tangible saving in original cost. Here the study of ground temperatures recommended above becomes important because it is felt that there is insufficient information regarding temperature gradients from the ground surface to various depths to estimate the saving that might be accomplished through reduction of depth of laying, because any such saving would have to be balanced

against the cost of dehydrating to the lower dew point required.

Use of Water-Sealed Holders

"Data has been obtained which shows that with an oil layer on the water, the gas leaving the holder will have a dew point only a few degrees higher than that entering the holder. This data was collected when no holder heating was in effect. Further data must be collected showing the rise in dew point when a holder is being heated and the overflow from the cups is passing down the inside of the lifts.

"An oil layer placed upon the water inside of the lifts, with the holder fully inflated, will not escape to the exterior, thus affecting the external appearance of the holder, except by the process of blowing, or allowing the water level in the cups to get too low. The Grand Rapids system has water-sealed holders using oil, and very definite information should be obtained from the observations which are being made on this system.

"Your committee does not consider that any modification of the B.t.u. standard or of present meters will be required by a company changing from the distribution of saturated to dehydrated gas. The bases for this conclusion are:

"I. There will be little difference between the character and quality of the gas measured at the consumers' meters whether it is dried before distribution or not. In the present practice of distributing saturated gas, considerable water is condensed in the distribution system and the gas reaches the consumers' meters saturated at a lower temperature than it left the holder. If the gas is dried before distribution, the water which ordinarily condenses in the distribution system will be removed by the dehydration plant and the gas reaching the consumers' meters should not have a dew point more than 5° lower than when distributing saturated gas. The difference between equivalent quantities of gas saturated at 50° F. and saturated at 55° F. is 0.23%. The difference between equivalent quantities of gas saturated at 35° F. and saturated at 30° F. is 0.13%. It would hardly be possible to make a correction for so small a difference.

"II. On the average there is probably 1½% decrease in the volume of saturated gas sent out before it reaches the meters due to condensation of water in the distribution system. This loss now ordinarily appears in the unaccounted for gas. As indicated above, it will be only slightly greater when the gas is dried. Inasmuch as meters are considered correct when they are accurrate to ± 2%, it would be rather hard to make any adjustment to compensate for this loss.

"III. Many companies are already distributing gas in certain sections of their territory which has been dehydrated by compression incidental to distribution. There is nothing to indicate that any of these companies have modified their B.t.u. standard of their meters. Further, many companies will probably distribute both kinds of gas for many years to come. It would be highly undesirable for such companies to have a dual standard."

Distribution Problems

Research Needs Emphasized

Fundamental studies supported by Association appropriation and among the principal recommendations of the distribution committee working under the chairmanship of M. I. Mix, two of the outstanding projects and other needs were outlined as follows:

"The problems for solution which the Pipe Joint Committee has in mind are not only to determine the adaptability of various types of pipe joints for future main installations, but also to determine the best and most economical method of repairing old pipe joints which are already laid and are found to be leaking.

"The problem of coating pipe systems will be attacked from the angle of protecting present systems which are already underground, as well as applying protection to future main systems when they are laid.

"If these two programs are followed out as proposed, I am sure that the gas fraternity will have made a step forward in the right direction in attempting to definitely ascertain the answers to some of their problems. The benefits derived from obtaining this information will be spread throughout the whole country, and each gas company will benefit according to its participation in gas distribution undertakings.

"The recommendation includes an estimate for research work for next year, involving an expenditure of $35,000 for the first year (1929) and $25,000 for the following year (1930). Of this amount the investigation of pipe joints will require $25,000 for the first year which will include expenditures for the equipping of a laboratory as well as research work and $15,000 the second year. The Protective Coatings Committee will require $10,000 a year for each of the next two years, which will provide for a technical representative of the American Gas Association to work in conjunction with the Bureau of Standards and the American Petroleum Institute.

"These amounts offhand might seem to be considerable; but when we realize that over 50% of our total investment in gas undertakings lies underground in the distribution system, which is subject to attack by corrosion, leakage, due to vibration of heavy traffic, stresses set up by upheavals of frost, etc., we cannot afford to neglect to combine in a concerted effort to protect our investment, which represents millions of dollars and to which we are adding additional investment year after year in ever-increasing proportions. By approving this program the American Gas Association will take the attitude of constructive cooperative research rather than to continue year after year to perpetuate the present method of insufficient and inadequate individual investigation."

Welded Pipe Joints

Sub-Committees Summarize Investigation, Report Costs, and Outline Procedure

The sub-committee under O. S. Hagerman rendered the report of the pipe joint committee which resulted from an elaborate research on preferred types of welded joints for ordinary distribution practice.

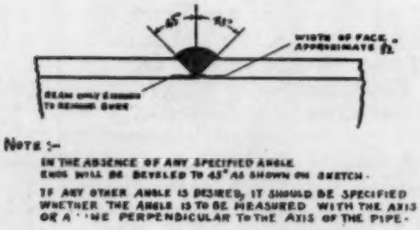
"From the results of these numerous tests on oxy-acetylene welded joints in full size pipe, the following conclusions may be drawn:

"1. A properly made oxy-acetylene welded joint is as strong as the pipe, fully 100% efficient.

"2. The simple butt welded joint is the most efficient and is recommended for use in welding pipe. This is in agreement with past experience as this design is practically universally used in pipe work.

"3. Very high strength and nearly equally satisfactory results were obtained with the normal socket and socket with groove joints. In joint design, however, other factors must be considered, as cost of preparation, stress distribution under strain, and ease of welding, which make these designs less satisfactory than the butt joint. The weakest joint was the socket

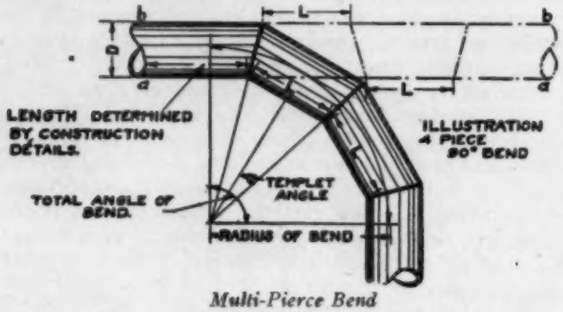
BUTT JOINT FOR WELDING


45°
WIDTH OF FACE APPROXIMATELY ½
CLEAN ONLY ENOUGH TO REMOVE DIRT
NOTE:-
IN THE ABSENCE OF ANY SPECIFIED ANGLE ENDS WILL BE BEVELED TO 45° AS SHOWN ON SKETCH.
IF ANY OTHER ANGLE IS DESIRED, IT SHOULD BE SPECIFIED WHETHER THE ANGLE IS TO BE MEASURED WITH THE AXIS OR A LINE PERPENDICULAR TO THE AXIS OF THE PIPE.

with welded rivets. This design should not be used because of cost, difficulties in welding, as well as lower joint strength.

"4. Due regard must be given to penetration and to the shape of the joint, particularly the reinforcement of the weld. This is more important in the larger than in the smaller pipe sizes. Butt welds should be reinforced at least 25% and should be built up so as to present a gradual increase in the reinforcement from the pipe wall to the center of the weld. Fillet welds, when used, should be built up well in excess of the wall thickness of the bell.

"5. There is no detrimental heat effect or structural weakening of the pipe metal due to welding.



Multi-Pierce Bend

"6. The uniformly high strength obtained in these numerous joint tests points out the dependability of properly made welds. With qualified welders under procedure control methods, a pipe joint of maximum efficiency can be consistently and uniformly made by the oxy-acetylene process."

Costs Summarized

The investigation of oxy-acetylene welding costs was undertaken by Wm. Henderson, of the Los Angeles Gas and Electric Corporation, who gave a resume of the results obtained in the gas distribution department of that company in the course of a very careful study carried out during July, 1928. Mr. Henderson, in reporting these results, emphasizes the fact that the data are applicable to welding with high-test welding rod and for welds flush with the pipe surface. It is also pointed out that the labor costs refer only to the pay of the welder. Pipe-handling expense is not included, as this was not considered a direct part of the joint-making cost.

In further explaining the low costs obtained for certain types of work, which have not always been duplicated elsewhere, Mr. Henderson states: "When we use low-carbon rod a 3-inch weld costs us about 30 cents. Now, with a high-test rod and flush welds, the same weld costs us approximately 17 cents. Going further back in our records, eight years ago a 3-inch weld cost us 60 cents."

COST DATA ON OXY-ACETYLENE WELDED JOINTS
Los Angeles Gas and Electric Corporation—
Gas Distribution Department
July, 1928

PIPE SIZE	2"	3"	4"	6"	8"	10"	12"	16"	20"
Time Per Weld	4 -Min.	5.8 -Min.	9.4 -Min.	15.9 -Min.	19.4 -Min.	26.9 -Min.	35.1 -Min.	44 -Min.	90 -Min.
Rate of Acetylene Flow Per Hour	20 C.F.	26 C. F.	28	29	35	36	37	40	47
Amount of Acetylene Per Weld	1.32	2 5	4.4	7.7	11 3	16.2	21.5	29.3	70.5
Rate of Oxygen Flow Per Hour	19	24	26	28	33	35	36	38	45
Amount of Oxygen Per Weld	1.3	2.32	4	7.4	10.7	15.7	21.1	27.9	67.5
Amt. of Wire Per Weld In Pounds	.15	.2	.3	.7	.9	1.1	1.4	1.7	3
Cost of Acetylene Per Weld	.027	.055	.098	.1172	.232	.361	.479	.653	1.57
Cost of Oxygen Per Weld	.013	.023	.04	.074	.107	.156	.211	.279	.675
Cost of Wire Per Weld	.023	.032	.048	.112	.144	.176	.224	.272	.48
Cost of Labor Welder Only	.04	.058	.094	.139	.194	.269	.351	.44	.90
TOTAL COST	.103	.168	.28	.513	.667	.96	1.265	1.64	3.62

Procedure Control

"These six requirements of a 'Procedure Control' or welding specification are:

"A. CHECK OF THE WELDERS to see that only competent operators are used, further that they prove their ability by successfully passing qualification tests.

"B. SELECTION AND INSPECTION OF MATERIAL so that only suitable weldable material is used and that proper welding rod is selected.

"C. DESIGN AND LAYOUT OF WELDED JOINT to insure that the joint is correctly designed for welding.

"D. PREPARATION FOR WELDING to see that the preparation and assembly is the best for welding.

"E. ORGANIZATION AND WELDING TECHNIQUE so that the welding is carried on in the most satisfactory and economical manner and that the welding itself or technique is correctly done.

"F. INSPECTION AND TEST to check whether the welding procedure has been followed and to see that proper welding results. The test of the complete work

With the basic purifying material "Lux," the most active and effective oxide of all precipitated oxides, it only required the addition of our carefully selected shavings, blended into a homogeneous mass by our exclusive process of mixing to produce "Lux-Sponge," the Perfect Ready Mixed Oxide.

Lux-Sponge

THE PERFECT READY MIXED OXIDE

The reputation of Lux-Sponge has grown so rapidly, that large, medium sized and smaller gas companies desirous of securing the purifying agent possessing the maximum purification qualities at the minimum cost per thousand feet of sendout, have invariably turned to Lux-Sponge as the *one* ready-mixed oxide that combined all these qualifications in the highest degree.

Lux-Sponge will purify more gas, revivify quicker and yield less back pressure under the severest operating conditions. Made in two kinds —Water Gas Sponge—Coal Gas Sponge.

"LUXIT H.T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. bags. *Order Sample Shipment Today!*

THE ALPHA-LUX COMPANY INC.

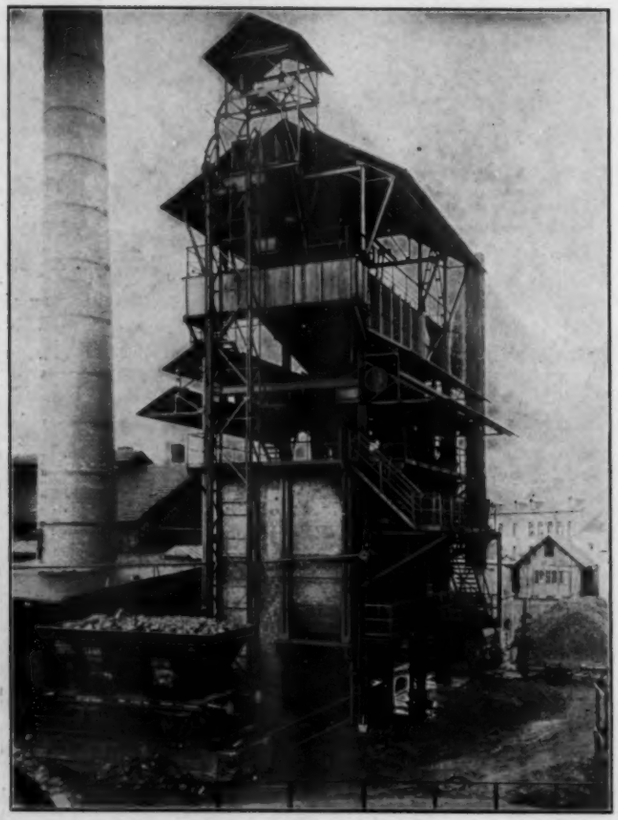
192 FRONT STREET — NEW YORK

"INDUGAS"

VERTICAL CHAMBER OVENS

With Water-sealed Drop Door

INTERMITTENT TYPE



Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

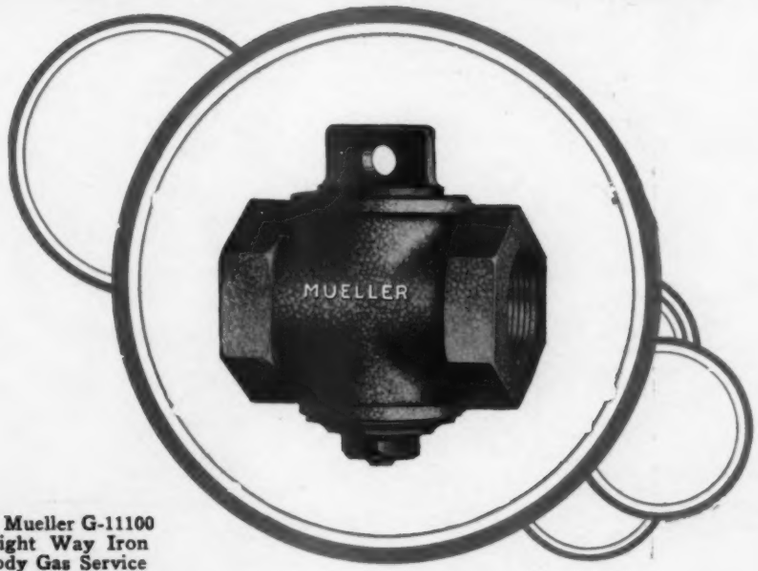
City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason

Full information, layouts and estimates gladly furnished

CARL STILL CORPORATION

114 LIBERTY STREET, NEW YORK



Mueller G-11100
Straight Way Iron
Body Gas Service
Stops

To best meet the needs of the industry

This aristocrat of all Iron Body Gas Stops is made of the best grade of gray iron obtainable. The precision in the molding and machining of these excellent service stops is typical of the uniformly high quality of product obtained through Mueller laboratory control of materials through every stage of manufacture.

Keys and Washers are made of brass, the bodies are reamed and the keys are ground and polished in.

Mueller has passed its three score and ten years of unbroken manufacturing experience. Having grown up with the gas utilities business, Mueller is in the best position to understand and meet the needs of the industry.

Price lists sent on request.

MUELLER CO. *(Established 1857)* **Decatur, Illinois**
Branches: **New York, Dallas, San Francisco, Los Angeles**
Canadian Factory: **MUELLER, Limited, Sarnia**

MUELLER

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street **Cleveland, Ohio**

is an additional insurance that the welding installation will give satisfactory service.

"A wide variety of special fittings, flanged ends, plugs, etc., which can be fabricated were illustrated in the fourth part of this committee report. With respect to such specials it is pointed out that the person in charge of inspection should be responsible for the quality of the work and should see that correct practices are followed:

"(a) That the templets are properly used.

"(b) That thorough fusion and penetration are obtained.

"(c) That the dimensions of the welds conform to the specifications given under Section "C" above.

"(d) That the welds are reheated at starting and finishing points.

"(e) That all tack welds are melted out.

"(f) That all welding rod conforms to the specifications set forth."

Premature Deterioration of Meter Diaphragms

By J. F. Anthes, The Brooklyn Union Gas Company

A two-year research has been conducted by the author. His conclusions indicate the important advances which may better metering conditions; and anything which will make the measurement of gas on the customers premises more precise should not be ignored by either manufacturer or gas man. The results of this investigation are recapitulated in the following summary.

"1. Meter diaphragms which have deteriorated while on the district usually contain a considerable amount of iron and sulphur. Although free sulphuric acid is also often to be found, it is seldom present in sufficient quantity to warrant the deterioration of the leather.

"2. All of the vegetable-tanned leathers except one were found to be weakened, and in some cases destroyed, by the action of moisture, and manufactured gas containing considerable hydrogen sulphide in the presence of tinned iron.

"3. All of the vegetable-tanned leathers except one were weakened to some extent by a moist atmosphere in the presence of tinned iron.

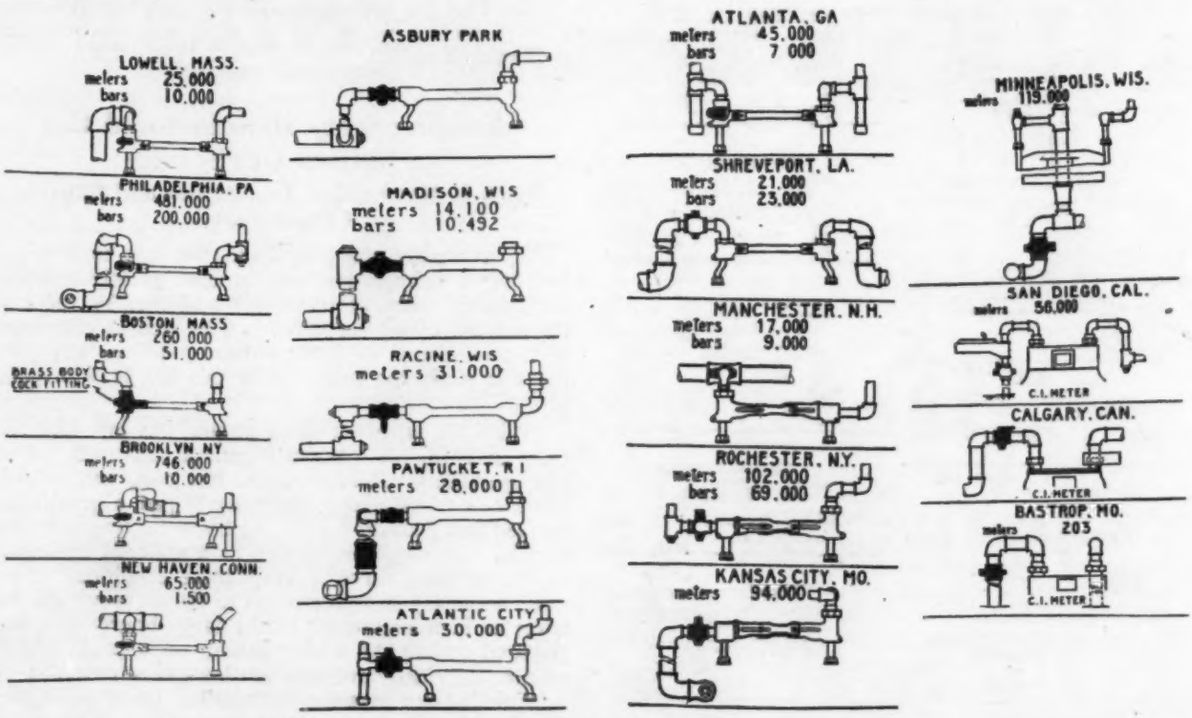
"4. The one vegetable-tanned leather which has been most resistant in the above tests was found to contain only pyrogallol tannins.

"5. All the semi-chrome leathers were on the whole more resistant to deterioration than the vegetable-tanned leathers by either gas containing considerable hydrogen sulphide and moisture in the presence of tinned iron or by a moist atmosphere in the presence of tinned iron. The semi-chrome leathers which were the least affected were those which approached nearest the specifications given in the latter part of this report.

"6. All of the vegetable-tanned leathers, even the pyrogallol-tanned sample, were badly deteriorated by a moist atmosphere of pure hydrogen sulphide in the presence of tinned iron, while the chrome leathers were practically unaffected.

"7. This deterioration of the vegetable-tanned leathers does not take place in the *absence of tinned iron* even though the gas be saturated with water vapor and of high hydrogen sulphide content.

"8. None of the leathers, vegetable or chrome, are affected at all by a *dry* gas even though it contains a large amount of hydrogen sulphide and tinned iron is present. In this case the tinned iron is itself unaffected.



Various methods of connecting 5 light meters.

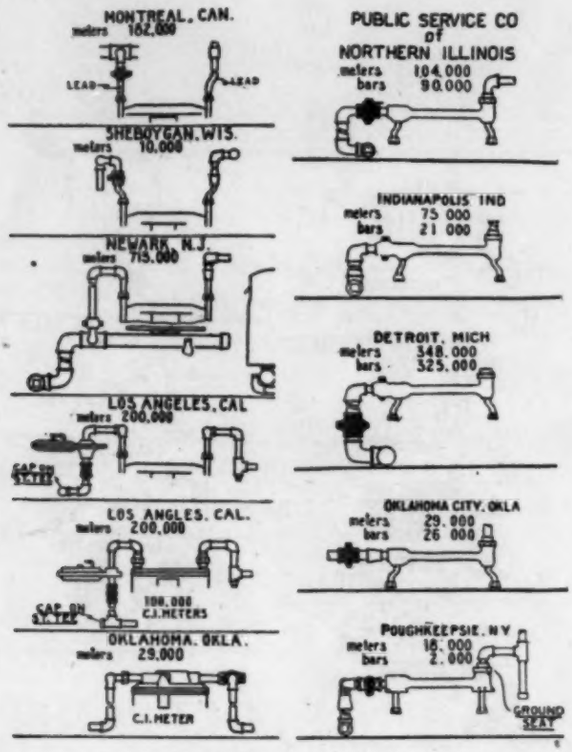
"9. Moisture and tinned iron are the vital factors in the deterioration of vegetable-tanned leathers. Any corrosive agent, such as hydrogen sulphide, accelerates the corrosion of the tinned iron and thus hastens the deterioration of the leather.

"10. Those leathers which absorb water most readily, as indicated by the "Drop Test," are generally found to be most readily deteriorated. The resistance of the chrome leathers seem largely due to the fact that these leathers have scarcely any tendency to absorb drops of water.

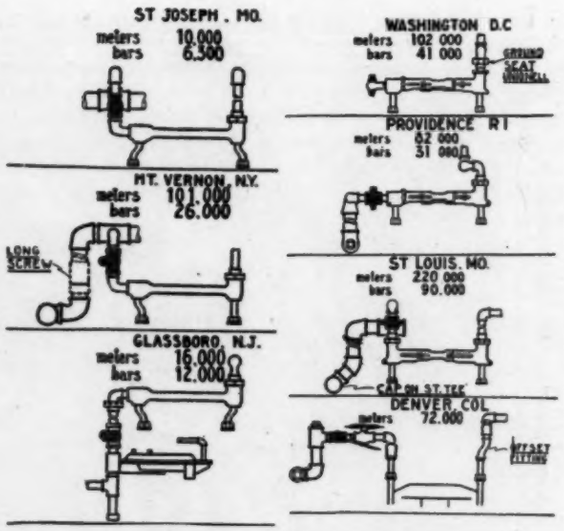
"11. When immersed in solutions of sulphuric acid of various concentrations, vegetable-tanned leather is more resistant to destruction than chrome leather. The latter goes into solution when the acid concentration is greater than 0.4N (about 2%).

"12. Vegetable-tanned leather is much more readily attacked by ammonia than chrome-tanned leather, the presence of water being necessary for this reaction.

"13. The semi-chrome leathers which showed the best results in our tests were those which withstood the action of boiling water for at least five minutes. Although semi-chrome-tanned leather has been found to be highly resistant to deterioration, nevertheless great care and discretion must be exercised in its purchase. There are many leathers on the market today which, while sold as semi-chrome stock, are decidedly inferior to a good grade of vegetable-tanned leather. The mere presence of chromium in a leather is by no means a guarantee that the leather has been properly tanned. In order to produce a well-tanned skin the chromium must not only be present in sufficient quantity, but it must also be combined with the collagen in such manner as to produce a substance which will be unaffected by boiling water.



Methods of Connecting 5 Light Meters.



Methods of Connecting 5 Light Meters.

Recommendations

"As a result of this investigation, we would offer the following recommendations:

"1. That semi-chrome leather be used in place of vegetable-tanned leather for gas meter diaphragms.

"2. The skins to be reasonably free from grain defects and "tick" and from flaying defects; the skins to be free from holes.

"3. That the leather contain at least 3.0% of Cr_2O_3 on the dry, grease-free basis.

"4. That the leather satisfactorily withstand immersion in boiling water for at least five minutes, and preferably fifteen."

Changing from Manufactured Gas to Natural Gas Service

By H. L. Masser, Los Angeles Gas and Electric Corporation

Any company changing from wet gas to dry gas, because of dehydration, any concern greatly reducing the heating value of its supply and thereby reducing the amount of oil vapor carried, as well as companies fortunate enough to secure natural gas from city service, can study the problems in this article with great profit.

"With the introduction of natural gas into Los Angeles in 1913, there began a general expansion of all gas operations. Because of its low cost, and its convenience and efficiency, there developed a greatly increased unit demand for gas for house heating and commercial fuel purposes, as well as a material expansion of the territory served. With these conditions, it became necessary to transmit gas to the more remote districts at high pressures, as the large hourly volumes, required during the winter season only, could not be economically delivered through low-pressure mains.

"Existing low-pressure distribution systems are usually found to be inadequate for supplying heavy house

heating demands. The load factor for house heating is very much poorer than for cooking and water heating, and the peaks are much more abrupt and higher. Where high peaks occur for periods of relatively short duration, it is essential that large main capacities be procured with the minimum investment.

COMPARISON OF INVESTMENT FOR TRUNK LINES 4 MILES LONG, DELIVERING 1,000,000 CU.FT. PER HOUR

Investment	*Low-Pressure Cast-Iron Mains*		*High-Pressure Steel Mains*	
Mains	15,840 30" @ $13.65, 2,640 24" @ 10.36, 2,640 20" @ 8.25,	$216,215 27,350 21,780	15,840 16" @ $5.00, 2,640 12" @ 3.80, 2,640 10" @ 2.90,	$79,200 10,030 7,670
		$265,345		$96,900
Governors Installed	Three 12" x 12" L.P. 250M/hr. One 10" x 10" L.P. 250M/hr.	4,820 1,500	Two 6" x 6" H. to L. Two 8" x 8" H. to L.	2,560 2,700
		6,320		5,260
Total Pipe Line Costs		$271,665		$102,160
Compressor Completely Installed	300 H. P. Motor Driven, Centrifugal,	43,800	Two 1,200 H. P. Sym. Motors, Reciprocating,	135,000
	Total	$315,465		$237.160

"It has been proven unnecessary to install such expansion joints in ordinary buried lines, for the temperature stresses are well within the elastic limits of the metal and the welds; further, to pull through the earth a length of pipe which has been buried for some time, would usually require a force in excess of the temperature stresses. To minimize tension temperature stresses as far as possible, sections of line several hundred feet in length are first welded together, and then these sections are finally welded together in the mornings when the pipe is cool. It is the practice of the Los Angeles Company to subject all high-pressure trunk lines to a hydrostatic pressure test substantially in excess of the maximum operating pressure."

The House-Heating Problem

New Investment Required and Seriousness of Problem Considered

Taking conditions prevalent in Chicago, J. J. Novy and V. F. Bittner undertook to determine the new investment needed in order to care for an additional gas-heating load equal in volume to the present maximum hour's send-out in the distributing system. The results, though not applicable universally, are definitely useful in showing one excellent procedure for anticipating distribution and other troubles as house-heating demands on the system grow. These authors have made a very thorough study which can well be imitated in many other communities. Their conclusions are:

"The different investments that must be provided to make possible the addition of a house heating load equal to the present maximum hour is expressed below in per cent of the total investment required:

	Per Cent
Deficit in distribution feeder mains in house heating areas	5.3
Reinforcing distribution system infuture house heating areas	7.4
Reinforcing 6" frontage mains	1.8
Transmission mains	24.8
Meters	51.1
Services	9.6
	100.0

"We have assumed that the miscellaneous type of house heating would consume 125 M per year. Our records show that the average consumption of central heating customers is in excess of 350 M per year. We assume that these estimates although smaller than the average consumption per year at this time, will be realized in the future when heating with gas will become more universal in smaller and better insulated houses with better designed and regulated heating equipment.

"With the use of the above-estimated yearly consumption for the two types of house heating customers, we find we must provide .22 cents of distribution investment per dollar of annual gross house heating revenue.

"In allowing for pumping equipment and holder investment we find that approximately 15% additional investment will be required, and that approximately $1.00 of distribution, pumping, and holder investment must be provided for $1.00 of annual house heating revenue."

Keeping the Holder Up

The seriousness of these house-heating demands from an operating point of view was strikingly summarized by E. A. Munyan, of Cincinnati, in the following language:

"There is just one very important factor to be considered in taking care of the enormous demands in the winter time and that is, that all of your facilities including holder capacities, will be taxed to their utmost and then to top it all off you may have an extended period of cold weather and you may not be able to refill your holders at the off-peak periods, which usually occur at night. Then the problem becomes very serious and if you should get caught short and run out of gas you will have to shut off your largest consumers to conserve the supply or put your whole city out of gas, or you will have to reduce pressures. That is the worst thing that can happen to you and to your house heating load as you will kill any future prospects and will lose a large part of your present load. This has not happened to us recently, but in past years and especially on natural gas properties, it was done

"The problem is ours to meet. We may have to install 'dump rates' to smooth out our load curves and to put stand-by plants to work but this can and must be done and we must start right now with the proper operating plants to take care of the maximum demands necessary.

MANUFACTURE OF WAX CRAYONS FROM COAL TAR

The suitability of wax extract from coal tar produced in the low temperature carbonization of coal for use as a base in the manufacture of colored wax crayons is being investigated at the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce. Several commercial colored crayons have been analyzed and similar crayons have been made up using the tar wax. From experiments so far made this wax appears very well suited to the purpose. It has a high melting point, which doubtless will render its use advantageous in making crayons for particular purposes.

The Theoretically Correct Gas Plant

F. W. Steere's Four Sample Plant Studies Show How to Determine Considerations Dominant in Plant Selection

THIS much condensed presentation merely illustrates the comprehensiveness of the method proposed by Mr. Steere. The complete paper, which is available from the Association headquarters, should be studied by any engineer desiring to apply this conclusion to his own local conditions.

"In order to reduce the problems of the gas industry to their simplest form for analysis and discussion, we will divide the industry into three divisions:

Division I—Production Division
Division II—Retail Gas Division
Division III—Retail Coke and Appliance Division

"If all the costs and credits of the industry are equitably allocated between these three divisions, then each division can be considered as an independent business and the earnings can be figured on the total investment within that division.

"This discussion is confined entirely to the business of the first or Production Division with the object of comparing the total cost of gas when made by different gas processes. In order to accurately reflect the total cost of gas, it must include all carrying charges including the 8% return on the investment. Any cost of gas which does not completely reflect the difference in investment cost between the different processes is misleading and valueless.

"The following table shows the factors which will be used in this discussion. These factors and their definitions apply to the business of the first division only, that is, the Production Division.

Factors Relating to Production Division

K=Annual make in M cu. ft. of gas.
T=Annual generating capacity in M cu. ft. of gas.
Y=Load factor.
A=Gas making materials in $/M cu. ft. of gas.
B=By-product credits other than coke in $/M cu. ft. gas.
C=Coke credit in $/M cu. ft. of gas.
D=Conversion cost in $/M cu. ft. of gas.
E=D—B.
F=Total investment in $/M cu. ft. of gas.
H=Depreciation in $/M cu. ft. of gas.
J=Administrative, general and fixed charges—other than depreciation—in $/M cu. ft. of gas.
P=8% return on investment in $/M cu. ft. of gas.
Q=Total cost of gas with all carrying charges, including 8% return on investment, in $/M cu. ft. of gas.

"The object of this discussion is to compare the values of Q when gas is produced by different manufacturing processes. Q represents more than is ordinarily included in 'holder costs.' It reflects not only the cost of making the gas, but the effect of the investment in plant as well as the earnings which the company is entitled to make on the investment. A comparison of Q for different processes and methods will therefore reflect a theoretically accurate comparison of the value of the processes compared.

$$Q=A+E-C+H+J+P$$

"With the various factors segregated, it becomes easy to recognize the relative importance that each factor plays in the final cost. It also gives an easy means of studying the effect on the final cost when changing the value of the various factors This is particularly interesting in the case of coke, C, as will be brought out more in detail later.

"In these illustrations of the application of the Q formula, the following assumptions are made:

Gas to be distributed at 530 B.t.u.
Gas coal—$5.00 per ton.
Boiler coal—$4.00 per ton.
Gas oil—6 cents per gal.
Ammonium sulphate—⅜ cent per lb. after deducting the cost of the acid and lime.
Coal gas tar—5½ cents per gal.
Water gas tar—4 cents per gal.

IN his convention address, Mr. F. W. Steere asks that the gas industry lay aside conventions and prejudices and make a real determination of the theoretically proper gas plant for any particular set of conditions. The discussion of Mr. Steere's contribution suggested exactly the right procedure for further development of this exceedingly important suggestion. This proposal was that a number of managements attempt to apply his engineering procedure to their particular company situation. This suggestion did not go far enough. Every management capable of making such an engineering analysis should carry out this problem for everyone of its plants. Even though at the outset the management may feel confident as to what this test will show, or even if they think that they have some better scheme, it would be unwise not to test this specific procedure proposed by Mr. Steere.

This proposal is indeed a challenge. And an industry so fundamentally engineering in its basis would be quite timid if it were unwilling to face the facts that such an analysis will bring forth.

CASE I

"We will first develop the factors so we can solve the Q formula under the conditions of Case I. Since this is straight coal gas under fired with its own gas, the sub letter for all the factors will be g, as A_g.

To obtain the value of Q for Case I, we group together the factors as shown below:

A_g=$ .65
E_g=$ .1394
H_g=$ .113
J_g=$ .1117
P_g=$ .1561

Q_g=$1.1702—C

Coke market value/ton=	$5.00	$6.00	$7.00
Q_g=$	.7162	.6262	.5352
Coke market value/ton=	$8.00	$9.00	$10.00
Q_g=$	.4442	.3542	.2632

The values of Q for the different market values of

coke can be read directly in the above table. This table is convenient in showing how the cost of gas varies with the coke market.

Summary of Case I

K_g=1,579,400 M per year. 4,327 M per day
T_g=2,044,000 M per year. 5,600 M per day
Y_g=.77 load factor
A_g=$.65
B_g= .0832
C_g=See table below
D_g= .2226
E_g= .1394

F_1=$1.3165
F_2= .3800
F_3= .0848
F_4= .1696

F_g=1.9509
H_g= .113
J_g= .1117
P_g= .1561

$$Q = A + E - C + H + J + P$$

A_g=$.6500
E_g= .1394
H_g= .1130
J_g= .1117
P_g= .1561

$1.1702—$C_g$

Q_g=$1.1702—$C_g$

Coke market value/ton=$5.00

Q_g=$ .7162

CASE II

"Case II is a carburetted water gas plant to handle the load curve shown in Plate I, page 3.

The sub letter for all the factors in this case, which is water gas, will be w, as A_w. In referring to the curves and tables, the sub w curves and tables must be used.

K_w=1,579,400 M per year. 4,327 M per day
T_w=2,044,000 M per year. 5,600 M per day
Y_w=.77 load factor

Summary of Case II

K_w=1,579,400 M per year. 4,327 M per day
T_w=2,044,000 M per year. 5,600 M per day
Y_w=.77 load factor
A_w=$.2350
B_w= .0180
C_w=0.
D_w= .0949
E_w= .0769

F_1=$.5620
F_2= .3800
F_3= .0471
F_4= .0942

F_w=$1.0833
H_w= .0628
J_w= .0792
P_w= .0867

$$Q = A + E - C + H + P$$

A_w=$.2350
E_w= .0769
C_w=0.
H_w= .0628
J_w= .0792
P_w= .0867

Q_w= .5406

Q_w=$.5406

"The value of Q as here shown reflects the figure at which gas can be sold by the Production Division functioning as a separate business and return 8% on the investment. This Q can be compared directly with the Q in Case I under the varying market prices of coke as shown.

CASE III

"In Case I we set up a coal gas plant of the capacity necessary to cover the load as diagrammed in Plate I. Practically, a coal gas plant is not sufficiently flexible to handle such a load efficiently. For the solution of this problem, we will then consider as Case III a combination coal and water gas plant, the carbonizing units being underfired with their own gas.

"It will be assumed that the coal gas plant will take the base load of 3,000 M cu. ft. of gas per day. Under these conditions, the coal gas plant will be operating at a 100% load factor. It should be especially noted that in this illustration the coal gas plant is being operated under the most favorable conditions. The supplementary water gas plant will have a capacity of 2,600 M cu. ft. per day, but in taking the variations in the load, the load factor on the supplementary water gas plant will be only .51. Inasmuch as both coal gas and water gas are considered in this case, the sub letters g and w will be used on all of the factor letters.

"In order to arrive at a true cost of gas, it is necessary to calculate the cost of the coal gas and the water gas separately for those items which are not joint in character.

Summary of Case III

K_{gw} = 1,579,400 M per year. 4,327 M per day
T_{gw} = 2,044,000 M per year. 5,600 M per day
Y_{gw} = .77 load factor

Coal Gas	Water Gas
K_g = 3,000 M per day	K_w = 1,327 M per day
T_g = 3,000 M per day	T_w = 2,600 M per day
Y_g = 1. load factor	Y_w = .51 load factor
A_g = $.6500	A_w = $.2350
B_g = .0832	B_w = .0180
C_g = .6350 Coke $7/ton	C_w = 0.
D_g = .2050	D_w = .1351
E_g = .1218	E_w = .1171
F_{1g} = 1.2329	F_{1w} = 1.0313
F_{2g} = .0616	F_{2w} = .0916
F_{3g} = .1233	F_{3w} = .1031
F_g = 1.4178	F_w = 1.1860
H_{1g} = .0822	H_{1w} = .0687
P_{1g} = .1134	P_{1w} = .0949
$Q_{1g} = A_g + E_g - C_g + H_{1g} + P_{1g}$	$Q_{1w} = A_w + E_w - C_w + H_{1w} + P_{1w}$
A_g = $.6500	A_w = $.2350
E_g = .1218	E_w = .1171
H_{1g} = .0822	H_{1w} = .0687
P_{1g} = .1134	P_{1w} = .0949
$.9674	.5157 — C_w
$-C_g$ = .6350	Q_{1w} = $.5157
.3324	
Q_{1g} = $.3324	

Combined Plant

Q_1 = Partial cost mixed gas with $7/ton coke
Q_1 = $.3886
F_g = .3800 combined plant
F_3 = .0190 combined plant
F_4 = .0380 combined plant
F = .4370 combined plant
H_g = .0253 combined plant
P_g = .0350 combined plant
J = .1117 combined plant

$Q_{gw} = Q_1 + H_g + P_g + J$
Q_{gw} = $.5606 with coke $7/ton

Coke market value/ton =	$5.00,	$6.00	$7.00	$8.00	$9.00	$10.00
Q_{gw} =	$ .6866	.6236	.5606	.4976	.4346	.3716

CASE IV

"Case IV is in every way similar to Case III except the coal gas plant is underfired with gas from an auxiliary plant, either blue gas or producer gas. This means that all of the gas from the coal is released for distribution so that the amount of coke produced is much less than in Case III. The apportioning of the expenses is in every way parallel to Case III.

Summary of Case IV

Auxiliary fired coal gas for base load. Water gas for balance of load.

K_{w} = 1,579,400 M per year. 4,372 M per day
T_{w} = 2,044,000 M per year. 5,600 M per day
Y_{w} = .77 load factor

Coal Gas		Water Gas	
K_s = 3,000 M per day		K_w = 1,327 M per day	
T_s = 3,000 M per day		T_w = 2,600 M per day	
Y_s = 1. load factor		Y_w = .51 load factor	
A_s = $ .4150		A_w = $ .2350	
B_s = .0531		B_w = .0180	
C_s = .4050	Coke $7/ton	C_w = 0.	
D_s = .2950		D_w = .1351	
E_s = .2419		E_w = .1171	
F_{ss} = 1.1780		F_{ww} = 1.6313	
F_{sw} = .0089		F_{wv} = .0516	
F_{sv} = .1178		F_{vw} = .1031	
F_s = 1.3547		F_w = 1.1866	
H_{sv} = .0785		H_{wv} = .0687	
P_{sv} = .1084		P_{vw} = .0949	
$Q_s = A_s + E_s - C_s + H_{sv} + P_v$		$Q_w = A_w + E_w - C_w + H_{wv} + P_{vw}$	
A_s = $.4150		A_w = $.2350	
E_s = .2419		E_w = .1171	
H_{sv} = .0785		H_{wv} = .0687	
P_{sv} = .1084		P_{vw} = .0949	
.8438 − C_s		.5157 − C_w	
$-C_s$ = .4050			
.4388			
Q_s = $ .4388		Q_w = $ .5157	

Combined Plant

Q_c = Partial cost mixed gas with $7/ton coke
Q_c = $.4624
F_s = .3800 combined plant
F_v = .0190 combined plant
F_c = .0380 combined plant
F = .4270 combined plant
H_s = .0253 combined plant
P_v = .0350 combined plant
J = .1117 combined plant
$Q_{cw} = Q_c + P_v + J$
Q_{cw} = .6344 with coke $7/ton

Coke market value/ton =	$5.00	$6.00	$7.00	$8.00	$9.00	$10.00
Q_{cw} = $	.7148	.6746	.6344	.5942	.5540	.5138

We now have the value of Q for 4 conditions for comparison and for further convenience they are listed in the following table with the varying market value of coke:

Coke market value/ton =	$5.00	$6.00	$7.00	$8.00	$9.00	$10.00
Case I — Q =	.7162	.6282	.5352	.4442	.3542	.2632
Case II — Q = .5406						
Case III— Q =	.6866	.6236	.5606	.4976	.4346	.3716
Case IV— Q =	.7148	.6746	.6344	.5942	.5540	.5138

"The comparisons in this table speak for themselves. With a $2 differential between the cost of coal and the market price for coke, the value of Q is about the same in Cases I, II and III, that is, water gas is on the same dividend earning basis as a straight coal gas plant or a combination water gas and coal gas plant where the carbonizing units are underfired with their own gas. Case IV represents the type of plant that has been widely built in recent years. The value of Q for this type of plant as compared with a straight water gas plant is very interesting.

"Let me again emphasize here that the results shown in the above table of comparisons between the four cases are based on the calculations as outlined. They do not necessarily reflect the practical solution of any gas problem. It is rather calculations of the kind that indicates a 6" I beam is the theoretically correct size. The practical answer must be arrived at by a consideration of the theoretical data and a complete knowledge of the local conditions.

"A study of the four cases shows that the three outstanding factors in the cost of making gas are:

The Coke Market.
The Load Factor.
The Initial Investment.

"It is an interesting fact that the great opportunities in business do not come as the result of revolutionary discoveries but rather by being able to recognize when economic conditions have changed so that the methods that were unprofitable yesterday become profitable today. It is not safe to take anything for granted. Coal gas can be made very cheaply if the differential between the cost of coal and the selling price of coke is sufficient. There is no question that there have been radical changes in the coke situation in the last five years as well as in every other branch of the industry. A study of the Q formula when applied to coal gas plants shows very clearly how important the coke credit is in the final cost of gas. This shows it is as much a coke business as it is a gas business.

"In conclusion let me say that the gas industry *cannot safely* proceed in the future on the theory that the base load should be coal gas. The gas industry, like most other industries, has reached the point where every factor must be thoroughly understood and accurately analyzed before a final conclusion is reached. While the figures here given are set up on a more or less theoretical basis, I feel that the information which they reflect justifies a further and more exhaustive study along this line."

FLOW OF NATURAL GAS THROUGH PIPE LINES

The purpose of a study being conducted by the United States Bureau of Mines is to obtain information relative to the flow characteristics of natural gas to be used in designing pipe lines and determining their capacities.

The study has been divided into four parts: A careful review and compilation of existing data; an investigation of the physical properties of natural gases such as the compressibility, relative viscosity and chemical composition and their effect on flow through pipe lines; obtaining data on as many operating pipe lines as possible; and basic determinations of flow conditions when using a field laboratory set-up where various factors that influence the flow can be controlled.

To date 23 pipe lines have been tested in the states of Kansas, Oklahoma, Arkansas, Louisiana, Texas and California. Preliminary calculations have been made of the actual quantity of gas delivered by each line as compared to the delivery rates calculated from the various pipe-line flow formulae. However, the volumes of gas passing through the line as actually measured at the orifice meters, have not been corrected for compressibility or deviation from Boyle's Law. The true volume of some natural gas deviates as much as 20 per cent from Boyle's Law at a pressure of 600 pounds.

Pipe lines ranging in diameter from 6 inches to 22 inches and in length from 6 to 65 miles have been tested. The results obtained indicate the necessity of basic information on the flow of natural gas. This will be obtained in a field laboratory apparatus consisting of a pipe line sufficiently long to give a noticeable pressure drop and located so that both the volume of gas flowing through the line and the inlet and outlet pressures can be increased or decreased. With this arrangement it will be possible to obtain data on the total frictional resistance of the pipe with varying velocities.

Tests are to be made in the future on pipe lines in New York, Ohio, Pennsylvania and Kentucky.

The "Brown Derby" Gas Range Campaign

By Russell G. White & Rodgers K. Tenney
North Shore Gas Company

A BROWN derby and a felt hat were responsible for the most successful gas range sale in the history of the North Shore Gas Company of Waukegan, Ill. The campaign was started off September 1 of this year and at its close, Sept. 31, a total of 179 gas ranges had been sold. This, in spite of the fact that the North Shore Gas Company has been promoting gas range sales intensively for the past 15 years, and is serving gas at the present time to approximately 22,250 consumers.

Unusual enthusiasm was shown throughout the entire duration of the sale. The whole selling force of the company seemed imbued with an excessive amount of "pep"—which fact is known to be traceable to a proposition made the salesmen at a meeting during the first few days of the sale.

Gas range campaigns heretofore had been conducted along the conventional lines of allowances on old stoves and special monetary inducements to salesmen. To break the monotony, one might say, of the same sort of program, officials of the company hit upon the unique idea to which is attributed no small measure of the campaign's success.

Broaching the Idea

At the salesmen's meeting during the first part of the campaign the "brown derby and felt hat" idea was brought before them. They all agreed to it and unanimously decided that none of them was going to have to wear the derby, which according to the terms of the agreement, was to be worn by the losing salesman at every sales meeting for six consecutive months after the conclusion of the sale. Each salesman did resolve, however, that he was going to be the winner of the good felt hat which was to be awarded the salesman selling the most ranges.

Assurance that the losing salesman would not fail to wear the "brown derby" was secured through all salesmen agreeing a penalty would be fixed by them to be imposed on the member of the sales force who either intentionally or unintentionally did not wear the "derby" at the stipulated time.

During the meeting each salesman was asked to state the number of sales he believed it possible to make in his territory during the campaign. The aggregate number of ranges was 122, which was 22 more than officials of the company believed it possible to make figuring on the basis of previous experience. The "target" for each salesman to shoot at was left, however, as placed by him. When the campaign was concluded it was found that practically every salesman had exceeded his mark and in some instances salesmen had nearly doubled their expected sales.

The district manager entered the spirit of the campaign with as much zest as the salesman. Each was determined that the "brown derby" was not going to adorn the head of any salesman from his office, and so did everything he could to spur on the salesmen under his supervision to put forth every ounce of sales energy possible.

Officials Interested

Even officials of the company had a more than usual interest in the campaign, and watched daily for the reports of the progress of the campaign which they read before attending to their customary duties.

Each morning a report was made showing the sales for the previous day as well as the accumulation of the sales to date. This report was distributed so that every salesman was posted as to the success of his competitors, thereby spurring each one on to greater efforts. Towards the last of the campaign numerous daily telephone calls were received from the various district offices seeking information before the day's report was issued. This is just one bit of evidence which shows the unusual excitement and interest displayed by all members of the company who were in any way connected with the campaign. Interest consistently at a high pitch tended to make the entire organization pull in the same direction. There was actual drama in the campaign. The last sale was closed 45 seconds before the termination of the campaign, and on the last day the salesmen climaxed their efforts by selling more gas ranges than had ever been sold in one day before in the history of the company. When the eight salesmen had checked in their sales for the day, it was found that 35 range sales had been closed, and that the loser had lost in spite of the fact that he had sold more than his quota.

The whole selling and executive personnel of the company expressed many times during the campaign

that they never had been connected with any other sales campaign which had given them so much enjoyment and cooperation. The sales report each morning was an inspiration for renewed efforts. Smiles were noticed on the faces of everyone in the commercial department and these broadened as the campaign progressed.

During the campaign the commercial manager urged on each salesman by personal letters complimenting him on his splendid efforts. A bit of irony was injected into one of these letters by the request that each salesman send in his correct hat size so that at the close of the campaign a "brown derby" could be purchased which would be the most "becoming" for the losing salesman.

While the success of the gas range sale is attributed chiefly to the stimulation of unusual interest among the salesmen because of the "derby" feature, customers were attracted to buy ranges during the sale period as a set of utensils, all of which may be classified as gas users, was given free with each gas range purchased. In addition to this, a small trade-in allowance was given for an old stove. These special inducements to prospective purchasers undoubtedly were of much aid to the salesmen in closing their sales, but to the "brown derby" goes the credit for stirring up the enthusiasm that made the salesmen bring in the most gas range business for one month ever secured by the North Shore Gas Company.

Campaign "Backbone"

The "backbone" of every campaign conducted by the North Shore Gas Company is a complete outline of the campaign. This outline is an important phase of the commercial department's work and played a principle role in the September gas range sale. The items contained in this outline are as follows: (a) general instructions (b) incentive to salesmen (c) incentive to other employees (d) employees' monthly letter (e) newspaper advertising (f) window display (g) bill inserts (h) distribution of special literature (i) daily sales reports.

A brief explanation of the above items is as follows:

(a) Under the general instructions are given special prices and allowances and premiums given the purchaser of the appliances featured. (b) Salesmen's incentive information states any special bonuses offered in addition to the salesmen's regular commission, and other information of special interest to them. (c) Incentives for employees includes the regular or special bonus given each employee for the securing of prospects which ultimately develop into sales. (d) The employees' letter is a copy of the regular monthly letter mailed to each employee, over the signature of the general manager, to his home address where he may read it without being distracted by his regular daily work. This letter contains an appeal to the employee to secure prospects and information on the features of the campaign which will interest him financially and otherwise. (e) A complete schedule of the newspaper advertising to be run in the local papers during the month enables each district manager and salesman to follow the advertisements and clip and use them. (f) Specifications for window displays made up by the advertising department provides a suitable display for each office. (g) Copies of all bill inserts mailed out with the monthly bills appear so that each district is advised in permanent form as to what information has been mailed out to each customer. (h) A statement is given of the method of distributing special literature by salesmen or other employees so that this feature will be uniform in all districts. (i) The daily sales report form is included with instructions so that each district office cooperates with the main office in correctly tabulating all sales and making up a report promptly at 9 a. m. each morning.

This ad helped

Each district manager is furnished with a copy of the outline so that he will be correctly and completely informed of all details connected with the campaign.

Every morning at 8 o'clock each district manager holds a meeting with the salesmen under his jurisdiction. This meeting is for the purpose of discussing all the details stated in the campaign outline and to talk over any difficulties or questions which might have arisen the previous day, as well as to spur each salesman on to greater efforts.

The lesson taught by this record gas range campaign appears to be that the salesmen do not necessarily have to be offered any extra pecuniary inducement to extend themselves. The fact that the campaign took on the form of a "game"—with each man striving to outdo his co-worker in the spirit of friendly competition—seemed to do more than all the extra bonuses ever offered by the company. The "money" took care of itself in the additional commissions reaped by the salesmen through their splendid number of sales.

The watchword—"Who'll get the derby"—instilled an activity unprecedented in the history of the company.

KNOWN FACTORS IN METER VALUE

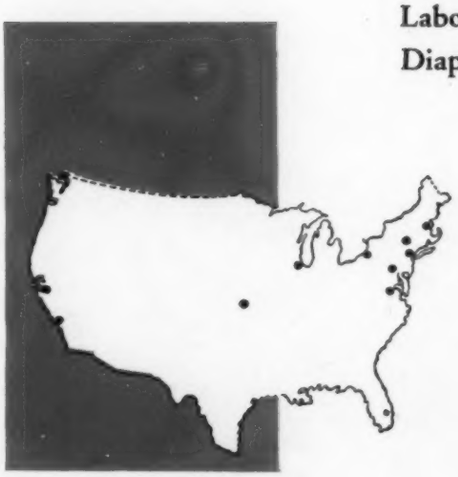
Gas Meters
for Domestic and Industrial Requirements
Manufactured or Natural Gas Operations

Meters for Demonstration, Demand, etc.

Meters for Large Volume Measurement

Laboratory, Experimental and Service Apparatus

Diaphragms and Maintenance Parts



American Meter Company

Incorporated

FACTORY AND SALES SERVICE

Factories:

AMERICAN METER COMPANY	*—105 West 40th Street*	—New York, N. Y.
AMERICAN METER COMPANY	*—Peoples Gas Bldg.*	—Chicago, Ill.
JOHN J. GRIFFIN & CO.	*—1513-21 Race Street*	—Philadelphia, Pa.
HELME & MCILHENNY	*—17th & Clearfield Sts.*	—Philadelphia, Pa
MARYLAND METER WORKS	*—Holliday & Saratoga Sts.*	—Baltimore, Md.
D. MCDONALD & CO.	*—991 Broadway*	—Albany, N. Y.
METRIC METAL WORKS	*—10th & Payne Aves.*	—Erie, Pa.
NATHANIEL TUFTS METER WORKS	*—455 Commercial St.*	—Boston, Mass.
PACIFIC METER WORKS	*—495 Eleventh Street*	—San Francisco, Cal.
PACIFIC METER WORKS	*—2118 Atlantic Street*	—Los Angeles, Cal.

WAREHOUSE AND SALES SERVICE

Offices:

AMERICAN METER COMPANY	*—216 Dwight Bldg.*	—Kansas City, Mo.
AMERICAN METER COMPANY	*—422 Oliver Bldg.*	—Pittsburgh, Pa.

A Full Measure of Known Factors

Every factory of American Meter Company Possesses in Full Measure the Modern Manufact
in Gas Meter Economy—Economy of Quality, in Prompt and Careful Delivery, of

MANUFACTURING FACILITIES

Strategic Location, Up-to-Date Equipment, Departmentalized Specialization, Ample Resources and Facilities for Research and Expansion.

Total Property Area—12 Acres. Manufacturing Floor Space—600,000 Sq. Ft.

SKILLED WORKMANSHIP

From the operation of Meter Repair Shops, Gas Companies appreciate the major importance of experienced personnel.

Skilled and *trained* workmanship is paramount in the Manufacture of Gas Meters.

Thirty-five per cent of the well taught and cohesive force that constitutes American Meter Company manpower has a record of more than 10 years of gas meter specialization with this company.

# of Leadership Assets
rs in Meter Value

Manufacturing and Service Assets that are so Essential in Giving Gas Companies a Maximum
elivery, of Easy Installation, Accurate Service and Low Cost Maintenance.

EXPERIENCE AND PROGRESSIVE POLICY

Through pioneer research and experimentation American Meter Company has blazed new trails in efficient and economical performance, yielding the best efforts of its engineers and research laboratories toward the advancement of industrial practice.

Today—the factories represented above receive from their customers that complete confidence which a long record of unfailing reliability alone can give.

AMERICAN METER COMPANY
Incorporated
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

LIST OF PRODUCTS

American Meter Company

INCORPORATED

METERS, DOMESTIC AND INDUSTRIAL SERVICE

Meters, A Type (*Tinned Steel Case*)
" B Type (*Tinned Steel Case*)
" C Type (*Tinned Steel Case*)
" Prepayment (*Tinned Steel Case*)
" Metric Iron Case (*Low, Medium & High Pressures*)
" Metric Iron Case Prepayment

METERS, DEMONSTRATION (Tinned Steel Case and Metric Iron Case)

Meters, Glazed Exhibition

METER DEMAND DEVICES

Empire Limiting Demand
Indicating Demand
Recording Demand
Maryland Demand

METERS, LARGE VOLUME MEASUREMENT

Meters, Linderman Orifice
" Westcott Orifice
" Wet Station

METER MAINTENANCE AND ACCESSORIES

Meter Connections
" Diaphragms
" Repair Parts

APPARATUS, LABORATORY AND EXPERIMENTAL

Calorimeter, American
Cubic Foot Bottles
Gassing Machines
Gasometers
Gauges, New Improved American Siphon
" Standard Siphon or "U"
" Superintendent's Pocket
Governors, Double Dry
" Laboratory Dry
" Wet Calorimeter
" Pressure
Meter Provers
Meter Testers, Hydro-Pneumatic
Meters, Wet Test 1/10 cu. ft.
" " " 1/20 cu. ft.
" " " Large Capacity (5-80 to 100-1200 cu. ft.)
Specific Gravity Apparatus, Schilling
" " " Bureau of Standards
Stop Clock
Stop Watch
Sulphur and Ammonia Test, Referee's
" " " " Young's
" " " " (H_2S) Chimney Type
Thermometers, Calorimeter
" Condenser
" Meter Prover
" Wet Test Meter

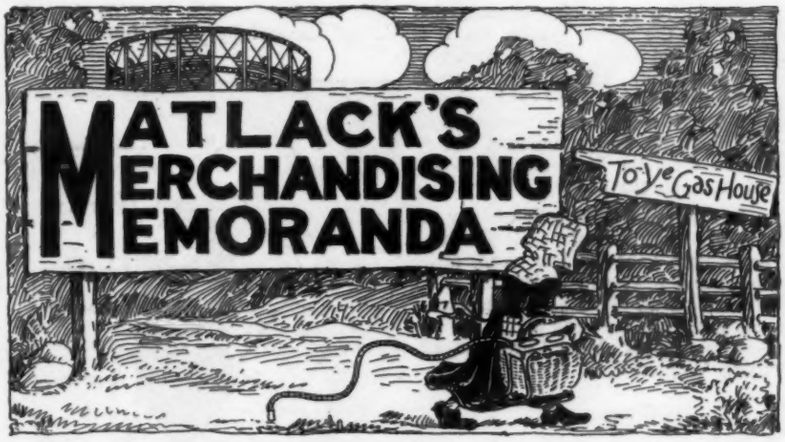
APPARATUS, SERVICE

Filters, Denver Gas
" R. G. T.
Furnaces, Gas Soldering
Gauges (*see Apparatus Laboratory*)
Index, Demonstrating
Meters, Critical Flow Prover, for H.P. Field Testing
" Demonstration
" Portable Test 20 cu. ft.
" " " 85 cu. ft.
" " " 5 and 10 Lt.
Thermometers (*see Apparatus Laboratory*)

SERVICE CLEANERS

Drip Pumps
New American Service Pump
Providence Vacuum Tank

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET



COLD WEATHER OPPORTUNITIES

November will bring the first frost to some sections, the first taste of cool weather to others, and the first snows to still more. November is a good month for the gas man for it means more opportunities to sell such appliances as clothes dryers, incinerators, portable and fireplace heaters, and many gas ranges. November finds the home manager confronted with the solving of the washing problem under adverse weather conditions, providing quick heat on short notice in the bath, living and dining rooms and satisfying appetities whetted by cold weather and made unusually large by the rarified air. Of course these opportunities lie everywhere for the gas man who plans early to cash-in on them by exposing his salesmen to enough home managers.

MIDNIGHT OIL

Eddie Brewer who "covers Dixie like the dew" has something to say on salesmanship that's worth checking up—listen: "In the evening, the lessons of the day gather shape in your brain. Plan, then, tomorrow's work. The experiences of the day stand out like the face of Lee on Stone Mountain (Ah' there, Ed.) and you are able to write out calmly your action for tomorrow.

"To sell Ruud (yes that's Ed's Job) it is absolutely necessary to see and tell the people. So when darkness falls, get in the glow of the evening Mazda and write out tomorrow's schedule. Put down on paper the names and addresses of all the people you intend to visit tomorrow. When night's candles are burned out and dewy morn stands tip-toe on Lookout Mountain (ah-h-h-h there Eddie) and your eyes are open to the glory of a new day, you will get up and get going without having to wonder who will be the first victim.

"Every Ruud salesman should start the day the night before and there's no law against making a sale after dark."

Atta boy!

EVEN SO

We are still convinced that the three saddest, maddest words in the salesman's vocabulary are: "something for you?"

Heavens! No!!, young man, I just came in to see if I could find someone who wanted to set in on a rubber of bridge."

THE TRUTH INDEED!

A week or so ago in a certain middle west city a man who was known to have quite a lot of money embarked in the washing machine business. A day or two after he had his shop in order he inserted an advertisement in the local newspaper for salesmen. On the day following a young man came in to see him and to proposition him on taking over all of his sales work. This was a new one and the owner asked: "How many salesmen have you that you can put on this job?" "Well said the young man if we can get together I would have two thousand salesmen working to sell the machine."

This was a surprising statement and the new dealer was dumbfounded for a moment or two; finally, however, he was able to ask for an explanation and the young man informed him that he meant exactly what he had said. "Here's the way I work it" he said; "everyone I sell becomes a salesman for me. You see I never try to sell on a rainy day. Whenever it rains I put an oil can and a screw driver and a pair of pliers into my pocket and I visit my customers, and go over their machines and we talk, and they give me enough names and enough information to keep me humping and selling on days when it does not rain. I have sold two thousand washers and every one of the people to whom I have sold them are helping me to develop prospects and actually sell machines. They are my sales force, and all for a little friendly attention."

This idea of "servicing" range customers and water heater customers has often been brought to the attention of gas appliance salesmen, yet we feel that it is well worth repeating for it still works if it's worked.

NEEDED—A PLAN

It seems that salesmanship needs a lot of de-bunking; complexes and catch-phrases have had the poor old boy going South for too many years. Efficiency experts, philosophers, thumb-print experts, hokum-artists, spellbinders, phrenalogists and psychologists have all rendered their meaningless tricks and now all of the modernists are agreed that they do not think the trouble is to be solved by anything other than man-power.

Now that is a simple remedy, but even

with man-power the puzzle will not be solved. Taking man-power; pow-wowing, and pushing it out will not get the business—what is needed is a plan. Any selling organization that has no plan, or that fails to follow a plan may have man-

power until it is running over, and yet fail to get out of the red—for as essential as man-power is to sales, sales volume at a profit just wont be there if there is no plan of selling. The plan is the *vital* thing in a campaign or in a continuous sales effort.

HERE'S A GOOD ONE

To use an expression that is current in a certain section of these United States, "He is a right smart fellow" that fellow who says: "The gas companies are doing some very fine windows these days; I admire them, they have all the qualities that good displays should have—but, in my case that is as far as I can go, if you know what I mean. I have no one in our organization who can either create them, or recreate them, if you'd rather. There is no artist in our town who could paint them and if we had them painted out of town, well it's just out of the question. We like them but we must be content to be lookers."

To you brother we offer this suggestion: you do not have to follow out the big ideas, that is you do not have to copy them to have attractive windows, nor do you have to spend a lot of money to have attractive windows. To illustrate this we are reproducing a Holiday window that is good, for the simple reason that it is neat, not over dressed, and "the Sweenys" can understand it. This window contains two cards made by a local card writer a portion of two display cards furnished by a manufacturer, three miniature Christmas trees from the "five and ten" and a bit of cloth on the floor.

Look it over and build your window accordingly. Work with the tools you have at hand, keep your window clean, make it simple and folks will understand what you're driving at. Had you other facilities we would say the same thing. Do not neglect to "get-up" some Christmas advertising Window displays.

ONE OF THE "STARS"

Of course there's something to this modern art in advertising. There were innovations in the gay nineties which caused grumbling comments— and as far back as history is recorded. Public Service companies here and there had a slight breaking out of advertising in the said gay nineties, but they ventured little past the stereotype "cook with gas," and it's only so recent that it seems but yesterday that gas companies' newspaper and direct mail advertising or window display advertising has come to the fore, and dared to portray the modern tie-into-the-times.

Without using two hands you may count the "stars" in the 1928 review of gas company advertisers; that is to say, the men who have dared to try a new one. Yet, you may not have seen them all (they are hard to collect) but they are coming and coming fast and no one can say the companies who have ventured away from the beaten paths have lost any public prestige (that's been the fear). Quite the reverse has been the outcome; those companies who have kept abreast of the times have popularized their company and their product, pleasing the public and successfully selling folks.

PORTRAIT of a Gas User cleaning up his basement
HOW much of the "cleaning up" in and around your house is due to the use and storage of raw fuel under it? Or the smoke and soot that come out of your chimney? Gas Fuel is spotlessly clean, and is stored where it causes you no care or annoyance. Have you estimated the cost of heating your home under our new gas rates? We will gladly do it for you, without the slightest obligation. Just mail the coupon today.
Visit the Exhibit of Modern Gas Equipment at our new Display Office, 101 Park Avenue (entrance 104 E. 41st Street)
CONSOLIDATED GAS COMPANY of New York
"To Serve New York"

Compare the Consolidated Gas Company's advertisement reproduced on this page with one of the vintage of ninety-eight. Can you compare them and "be yourself?"

OLD STUFF

The "trying to win a prize, help me out" appeal is worn threadbare in selling the home manager and while there has been no general use of this plea to sell gas appliances, there has been some by those who regard selling as a game, a word, you can't get away with it. Besides, gas appliances are so important in the management of the modern home that the house-wife will buy them if you are salesman enough to show her what they will do for her.

THE "CAREFREE" FUEL

"Gas the Carefree Fuel" is the title of a booklet being distributed by the Illinois Power & Light Corp. to prospective house heating customers of that company in Southern Illinois. Prospects are developed by salesmen in the house heating de-

partment and through the use of newspaper advertisements containing a coupon, one of which is reproduced on this page.

Of Course
You Can Afford To
Heat Your Home With GAS!
You may prove to your own satisfaction that you can afford to heat your home with GAS
Use the Coupon Below, Send for Our Booklet Showing
Photographs of a number of Southern Illinois homes together with the cost of heating them with GAS, the care free fuel. These home owners have left the irksome task of firing their furnaces to the gas man. They have given up storing their fuel. It now comes to them through a pipe line directly to their furnaces, which are regulated automatically by a thermostat—no more trouble than winding a clock once a week—and they pay for their fuel after, but before, they use it!
Get this booklet for the asking
Illinois Power and Light Corp.
East St. Louis, Ill.
Kindly send me a copy of your booklet "Gas, the Care-free Fuel."
Name
Address
Gas
Phone East 1041
Illinois Power and Light Corporation
417 Missouri Ave.

A LOT TO THINK ABOUT

Cut prices in CAPS is being indicted by both the progressive new business managers of gas companies and by the knowing manufacturers. They have both come to the realization that "you have first to put in before you can take out" and that often low priced enameled ranges, for instance, are inferior enameled ranges; ranges that the gas man cannot sell to his customer "with his usual guarantee of satisfaction."

"Why", said the commercial manager of one of the larger gas companies, "we have to sell just twice as many ranges today as we did a year ago, before this slashing of prices started to get our volume in dollar and cents merchandising sales, and to show a net that is satisfactory to the chief and the board of directors. These men are interested in units, naturally, but, oh' brother, you have my word for it that 'net' is the thing that makes them happy. Last year, for instance, when we looked at our little data book and saw that we had sold twice as many ranges as we had sold in the preceding year we were much elated until we looked at the dollar and cent volume; then our heart sank, for we were short of net as against the preceding year—and all the while we had sold more merchandise.

"When we learned this we did what the average gas man does, we began to look about for a reasonable excuse with a bright side, and we hit upon the idea. Well, with the added number of ranges we have added gas customers; ah yes, that was the redeeming feature, but our little bubble was soon to be pricked. The statistical departments report indicated that even though we had sold an increased volume of ranges our sendout was increased at a rate slightly below that of the previous year!

"We now feel that we have reached the point where we have to work along some other line and I am working on an idea that quality will precede price and that as rapidly as we can, we will entirely discontinue price merchandise and abolish cut-prices."

There is a lot to think about in what this man has said.

THIS AD CAN BE SEEN

Here is a novel heater advertisement produced by the advertising department of the Kansas Gas and Electric Company. This is the type of advertisement that cannot be buried by the larger department store variety so common in the larger daily papers.

QUICK HEAT
The hearth fire's genial glow—at the touch of a match!
What would not our ancestors have given for such convenience. All the beauty, all the romance of the fireplace is yours—without its smoke, its dirt and ashes, its inconvenience.
For a bathroom from which you wish to take the chill; for baby's nursery; for cool days when it is not cold enough to light your furnace, the gas heater is the quickest, handiest and least costly warmth provider yet devised.
Kansas Gas and Electric Company has an almost unending variety of gas heaters. Every taste in design, every demand of the purse, is met.
The next time you pass our appliance salesroom, step in. We will show you our line of gas heaters, and other appliances, gladly, without obligation to you. It is part of our service to you—the service which extends from the furnishing of the gas itself to the provision of the appliances with which you can make it useful.
Kansas Gas and Electric Company
"At Your Service"

Conducting A Cooking School Where Cooks Are Cooks

By Special Correspondent

WE may live without friends; we may live without books; but civilized man cannot live without cooks," so quoted E. J. Wagner, Manager of the Washington County Gas Company, Johnson City, Tennessee. "Just look at that crowd O. M. if you doubt me. Did you ever see anything like it Fred?"

So went the little dialogue down in that thriving Tennessee city during the recent cooking school conducted by Miss Cephalie Lewis, Director of the Home Service Department for the southern division of the Central Public Service Company, Chicago.

The Washington County Gas Company is one of the late acquisitions of that company and the cooking school was the first phase of a complete educational plan undertaken to acquaint home managers of Johnson city with the many new home labor saving devices the company has for sale, together with the proper way to use them to the best advantage. Also these schools are a part of a comprehensive effort to build up favorable public opinion and to impress upon the public the fact that it is the company's earnest desire to render the best possible service.

Newspaper Opinion

The school was one of the most popular and well attended public gatherings ever held in Johnson City. A local newspaper had this to say regarding the opening of the school and Miss Lewis, who holds so enviable a reputation in Dixie, where cooks are culinary artists;

"Large Crowd at Opening Session of Cooking School:

Miss Cephalie Lewis, conducting the cooking school offered to the women of Johnson City, was the central attraction Monday afternoon, when the first of five days series of demonstrations was started at 2.30 o'clock in the Municipal Auditorium. Miss Lewis, one of the foremost authorities on cooking, serving and household conduct, was assisted by Miss Anna Gresham, formerly in charge of home economics at the Junior High School.

"The doors opened at one o'clock and by 2:30 the auditorium was comfortably filled with interested women of the city and surrounding territory; many with note books and pencil, taking advantage of the many timely and modern suggestions given by Miss Lewis in food preparation and serving.

"The stage was tantalizing arranged. with kitchen and household equipment of the most modern type; two gas ranges, cabinet, an array of utensils, and a large stock of well chosen supplies, with Miss Lewis and her assistant giving their practical demonstrations of the culinary art little short of magic.

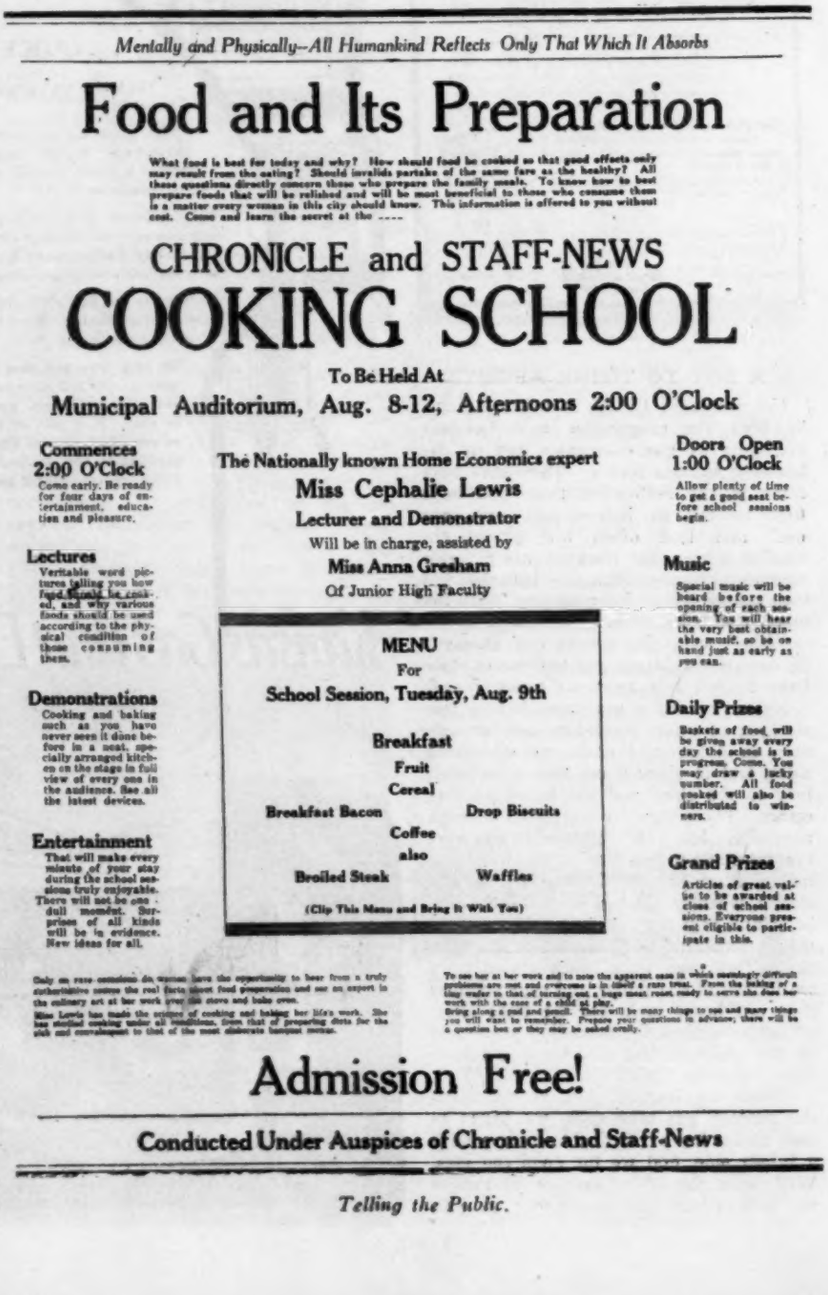
"Of little less interest were the many well filled baskets of food and supplies, given away as prizes to several of the fortunate ones attending."

The cooking school continued for five days, and was well attended each day. The school was well advertised by O. M. Butler, New Business Manager for the company, and by the company's Store on Wheels, under the direction of Wm. F. Eve, Division Sales Manager.

Manager Wagner, who has spent a number of years in the public service field says; "the week was a most successful one from every angle. Sales were numerous, attendances wonderful and today everybody in town is talking about gas and gas appliances that will lighten their home labors."

The company was so well pleased with the results of the demonstration and the interest shown by the citizens of Elizabethtown, adjoining Johnson City, that extensions to that city were authorized.

In order to show those interested in


Mentally and Physically—All Humankind Reflects Only That Which It Absorbs
Food and Its Preparation
What food is best for today and why? How should food be cooked so that good effects only may result from the eating? Should invalids partake of the same fare as the healthy? All these questions directly concern those who prepare the family meals. To know how to best prepare foods that will be relished and will be most beneficial to those who consume them is a matter every woman in this city should know. This information is offered to you without cost. Come and learn the secret at the ----
CHRONICLE and STAFF-NEWS
COOKING SCHOOL
To Be Held At
Municipal Auditorium, Aug. 8-12, Afternoons 2:00 O'Clock
Commences 2:00 O'Clock
Come early. Be ready for four days of entertainment, education and pleasure.
Lectures
Veritable word pictures telling you how food should be cooked, and why various foods should be used according to the physical condition of those consuming them.
Demonstrations
Cooking and baking such as you have never seen it done before in a neat, specially arranged kitchen on the stage in full view of every one in the audience. See all the latest devices.
Entertainment
That will make every minute of your stay during the school sessions truly enjoyable. There will not be one dull moment. Surprises of all kinds will be in evidence. New ideas for all.
The Nationally known Home Economics expert
Miss Cephalie Lewis
Lecturer and Demonstrator
Will be in charge, assisted by
Miss Anna Gresham
Of Junior High Faculty
MENU
For
School Session, Tuesday, Aug. 9th
Breakfast
Fruit
Cereal
Breakfast Bacon
Drop Biscuits
Coffee
also
Broiled Steak
Waffles
(Clip This Menu and Bring It With You)
Doors Open 1:00 O'Clock
Allow plenty of time to get a good seat before school sessions begin.
Music
Special music will be heard before the opening of each session. You will hear the very best obtainable music, so be on hand just as early as you can.
Daily Prizes
Baskets of food will be given away every day the school is in progress. Come. You may draw a lucky number. All food cooked will also be distributed to winners.
Grand Prizes
Articles of great value to be awarded at close of school sessions. Everyone present eligible to participate in this.
Only on rare occasions do women have the opportunity to hear from a truly authoritative source the real facts about food preparation and see an expert in the culinary art at her work over the stove and bake oven.
Miss Lewis has made the science of cooking and baking her life's work. She has studied cooking under all conditions, from that of preparing diets for the sick and convalescent to that of the most elaborate banquet menus.
To see her at her work and to note the apparent ease in which seemingly difficult problems are met and overcome is to class a rare treat. From the baking of a tiny wafer to that of turning out a huge meat roast ready to serve she does her work with the ease of a child at play.
Bring along a pad and pencil. There will be many things to see and many things you will want to remember. Prepare your questions in advance, there will be a question box or they may be asked orally.
Admission Free!
Conducted Under Auspices of Chronicle and Staff-News
Telling the Public.

The School in Session

cooking school advertising we are reproducing one of the advertisements used in Johnson City together with a photograph of a session of the school.

Seasonal settings with cozy fireplaces, windows with turkeys, pumpkins, and Autumn foilage always attract attention.

WE MIGHT AS WELL FACE THE FACTS

Why is it that along about November or early December each year the newspapers carry what seems to be just ordinary news items, in which it is narrated that the vast army of shoppers who are crowding the stores are eagerly buying electrical appliances?

Every experienced person knows that it is not because of any equality between the gas range and the electrical appliances, for cooking purposes, because the gas range is superior in every manner. What then is the reason?

The electrical appliance men are consistent advertisers, in the newspapers and while the writer has no facts to show that the "news items" referred to hereinbefore are paid advertisements, it is within the realm of circumstantial evidence to think so.

Newspaper owners are in business to make money and are open to gas advertising, but they get very little as compared to the electrical industry, hence it is that statements from their "friends" are quickly nabbed and just as quickly printed.

Not long since a banker was quoted: "I have not used gas in my home for sometime. Everybody is using electricity!"

That banker was no doubt influenced by the many electrical advertisements he had read. Just how many more are like him or will follow his lead, no one can say, but if something is not done to meet the opposition it is safe to say that there will be as many as can afford to pay the excessive cost of a general electric service about the home.

Now is the time to start working, not to wait until the Christmas shopping gets under way and most of the folks already converts to electrical appliances. One gas range will do the work of all the cooking appliances which are operated electrically and do it cheaper. That is the truth and that is the platform we should stand on, work on and keep eternally preaching.

GAS HEATS OLDEST HOUSE IN FALL RIVER

What is believed to be the oldest house in Fall River was built in 1763. The house was built entirely of hand-hewn oak which today is so hard and well preserved that it is difficult to cut or even to drive a nail into it. Some of the doors are made of a single piece of oak, while others are made up of two pieces mortised together.

Originally the cellar served as a kitchen, where there was a huge fireplace from which air ducts were led to rooms in the upper part of the house for heating. There was also a fireplace on the ground floor.

Subsequently, this primitive heating plant was succeeded by a hot air furnace. The present owner has installed a gas-burning furnace as well as an automatic gas-fired hot water heater, and the cooking is all done by means of gas appliances.

DECORATIVE TIMES AHEAD

The fall season, especially the approaching time around Thanksgiving day and Christmas, offers many, many opportunities to the man who builds advertising window displays. The approaching holidays in themselves all hold numerous ideas around which to build displays.

Book Review

Outlines of Public Utility Economics. By Martin G. Glaeser. The Macmillan Company, New York. Price $4.25.

Professor Glaeser's interesting and scholarly treatise should appeal to the general reader interested in public utility problems—and who is not interested? To those who come into more intimate contact with the administration and operation of public-utility enterprises, this book will prove to be of particular interest on account of the breadth of its viewpoint and its lucid and straightforward style. Although it is evidently written primarily as a university text book, its historical and economic-legal character, covering as it does the whole field of public-utility enterprises, give it a high place in its class.

The subject is treated under four general headings: The economic basis of public-utility enterprises; the development of agencies of regulation; the administration of utilities under regulation, and finally, the trends in public policies affecting regulation. There are 33 chapters, 36 graphic charts and 44 tables, together with appendixes containing bibliographies.

The author's long experience as statistician and case investigator with the Wisconsin Railroad Commission, his consulting work for public and private corporations, and his university experience have enabled him to present the economic problems of public utilities as a group, fundamentally and in their interrelationships in an interesting, clear and convincing manner.

Experiments on Siliceous Refractories

The use in gas works and coke oven plants of materials which contain more than 95 percent of silica is very extensive. Hence the Parisian gas company thought fit to institute a research on this subject and while these tests have been of an empirical nature up to the time being and consisted merely in making forms out of such materials and used them in horizontal retort installations, a more scientific examination is promised later. The question of the expansion of the siliceous brick and the like was gone into in great detail. Attention is called to the phenomenon of after-expansion or permanent expansion as distinguished from thermal expansion or reversible expansion.—*M. Laedlein, Le Gaz et l'Electricite, year 1928, page 238.*

Association Activities

A. G. A. and affiliated gas associations' sectional activities and convention calendar

New England Gas Operating Men Hold Profitable Session

ONE hundred and twenty-five representatives from the operating division of New England Gas Companies attended the opening session of The New England Gas Association, Operating Division, which was held at the Hawthorne Hotel, Salem, Mass., on Friday and Saturday, September 28th and 29th. Discussions of technical and practical problems, the need of greater education on the part of the public in the use of gas, and co-operation in the industry were the keynotes of the enthusiastic meeting.

Speakers on Friday evening included H. Vittinghoff, Chairman of the Committee of the Operating Men, G. W. Stiles, President of the New England Gas Association, and General Superintendent of the Portland Gas Light Company, and E. G. Watson, technical expert and representative of Holmes & Company, Huddersfield, England. In addition to the business session the representatives visited many of the historic buildings while others enjoyed golf. Many of the members were accompanied by their wives.

The meeting was officially opened on Friday evening, September 28th with a fine banquet. Mr. H. Vittinghoff, Chairman of the Committee, was the only speaker during this part of the program.

In his remarks he thanked the wives of the members for their interest. He urged the members to take advantage of visiting the historic places in the city and particularly the new model offices of the gas light company. Seated at the head table were Mr. and Mrs. John L. Tudbury, and other high officials of the New England Gas Association.

Following a brief adjournment after the banquet, the business meeting was opened by Mr. Vittinghoff, who emphasized the need of the members of the operating division sharing the responsibility with other divisions in the various problems, and urged them to avoid the single track of mind.

The first speaker of the evening was Mr. G. W. Stiles, who spoke particularly on the work conducted at the Portland Gas Light Company by the operators and distributors and the results achieved. Mr. Stiles stressed the necessity of educating the public in the practical use of gas, and its possibilities, and deplored the lack of young men in the industry.

Mr. Stiles spoke particularly on recent inventions, in the gas industry, commenting upon the new gas refrigerator and many others. He gave a few figures to show the unusual growth of the Portland Gas Light Company. Concluding his talk he urged the members to advertise "Gas—The Better Fuel."

The feature of the evening was a paper presented by Mr. J. S. Ferguson, Chief Chemist of the Haverhill Gas Light Company, who spoke on the subject of "Some Considerations Regarding Dehydration of Gas With Calcium Chloride."

The success of the dehydration of gas in England was told by Mr. E. G. Watson, technical expert, who explained the various experiments of the stations in England, and the remarkable saving which had resulted, together with improved conditions in the meters and service lines. Mr. Watson answered many questions following his brief address. His talk proved interesting as well as instructive.

Saturday, September 29th was devoted to an inspection of the new offices of the Salem Gas Light Company and a business session At the business session, Mr. R. C. Downing, Superintendent of Manufacture of the Lowell Gas Light Company, spoke on the subject of "Experience With Naphthalene Removal in an Immersion Type Washer."

According to the speaker, there is probably no subject which has received as much attention from gas men in general, during the history of the industry as naphthalene. Mr. Downing in his address presented his actual experiences covering a period of six years of intimate contact with the vexatious problems of the naphthalene removal.

CONVENTION CALENDAR
NOVEMBER

14-15 Rocky Mountain Oil and Gas Association Convention, Casper, Wyo.

19-24 Second International Conference on Bituminous Coal, Carnegie Institute of Technology, Pittsburgh, Pa.

4-7 Eighth Annual Short Course in Meter Repairing and General Gas Distribution and Production of Iowa State College and Mid-West Gas Association, Des Moines, Iowa.

11 Mid-Year Meeting Pennsylvania Gas Association, Harrisburg, Pa. George L. Cullen, secretary, Pennsylvania Gas Association, Harrisburg, Pa.

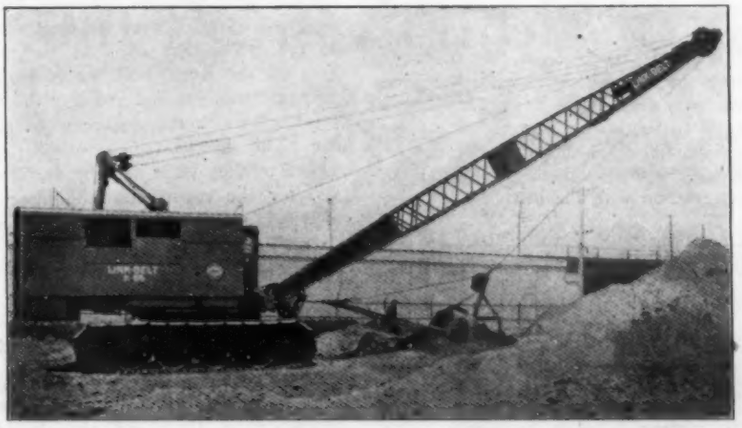
Beal Medal awarded to Louis Stein and L. J. Willien

Equipment News

New Link-Belt 2-Yard Shovel

Indicative of the trend toward the more powerful, greater capacity machine is the announcement by Link-Belt Company, of Chicago, Indianapolis and Philadelphia, of the addition of a full 2-yard capacity machine to their line of crawler cranes, shovels and draglines. Heretofore the largest capacity machine built by this company was a 1½ yard unit.

The Link-Belt K-55, as the new machine is known, is a powerful, heavy duty, all-purpose, 2-yard machine, primarily designed for the following adaptations:



SHOVEL with 30-ft. boom and 18-ft. dipper stick carrying a 2-yard struck-measure-capacity all-manganese-steel dipper.

DRAGLINE to handle 2-yard dragline bucket for medium and medium-heavy excavating, on boom 50-ft. long; or a 1½-yard dragline bucket on boom 60-ft. long.

CLAM SHELL BUCKET of 2-yard capacity, for sand, gravel or materials of equal weight per cubic foot, and consistency, on boom 50-ft. long; or a 1½-yard bucket, in such materials on boom 60-ft. long; or, of course, an equivalent weight of loaded bucket in heavier or lighter materials.

TRENCH SHOVEL, 2 yard capacity.

All attachments are interchangeable without removing or disturbing the mechanism of the machine proper.

Incidentally, it is claimed that this is the only machine of, or near, its capacity which does not require extensive dismantling and preparation for shipment.

Besides the unit cast steel construction of lower and upper frames; self-cleaning crawler treads and large bronze-bushed crawler rollers; enclosed cut gearing and bronze-bushed bearings throughout—features which Link-Belt Company has pioneered since they first began to build crawlers, other details of construction, include:

Internal expanding friction clutches of unusual size and power, the main drum clutches being 42″ in diameter; and swing and travel clutches, 30″ diameter.

A 13½″ diameter center pin, adjustable from above, which can be removed as a unit with the vertical travel shaft assembly, without removing any other parts.

Large drums with renewable cast steel shells, having air space between clutch and brake surfaces, for rapid cooling; and large, powerful drum brakes, 48″ diameter by 5″ wide.

The machine in working condition is 12-ft. wide overall at the lower frame, which gives it ample stability for the work for which it is designed. Crawler treads are 36″ wide.

The K-55 is built to be driven with gasoline engine, electric motor or Diesel Engine drive.

Roots Blowers Now Use Anti-Friction Bearings

The P. H. & F. M. Roots Company, Connersville, Indiana, originators, patentees and manufacturers of two-impeller rotary positive displacement units, announce the general adoption of anti-friction bearings for their Blowers and Acme Blowers.

The standard line of Blowers carries Timken or SKF heavy duty roller bearings upon the purchaser's specification, and the Acme line of smaller units carries roller or ball bearings upon specification.

Constant research and construction work over a period of the past twenty years has convinced The P. H. & F. M. Roots Company, established 1859, that the manufacture of anti-friction bearings has now been perfected to the point where they recommend and use them.

A roller bearing has not merely been substituted for one of the adjustable babbitted type. The Roots Blower construction has been redesigned entirely, and changed to allow every additional operating advantage. Extreme care has been taken in designing the mounting. It is claimed that complete protection from the entrance of foreign substances into the bearing housing has been afforded. Ample space is allowed around the bearing for a sufficient supply of lubricant, and provision is made for forcing the lubricant through the bearing from one side to the other.

In no case does the maximum load and speed of the bearing selected exceed one-third of the manufacturer's rating. Aside from the reduction in friction loss, Roots Blowers with anti-friction bearings offer new possibilities for direct connection to the smaller motors with less horsepower to obtain increased capacities, operate with higher efficiency by permitting the use of more closely fitting cases, permit greater capacities with conservative speeds, and deliver more volume with less horsepower.

Prest-O-Lite Flood Light Attachment

The Prest-O-Lite Co., Inc., 30 E. 42nd St., New York City, announces a flood light attachment of new design for use with the familiar small tanks of dissolved acetylene, the same as are used for truck and tractor lighting.

Prest-O-Lite gas tanks are available from service stations throughout the

country. By the connection of the attachment a convenient, portable, powerful flood lighting unit is obtained which can be used for illumination in dark places and for facilitating night work of all kinds.

The improved attachment, illustrated herewith, is of simple, strong, rigid and compact construction. Universal adjustment is obtained with only one swing joint, this minimizing the possibility of leakage.

Because of the substantial construction of the new part and because of its position near the center line of the tank, the attachment itself can be used as a handle in carrying the entire unit.

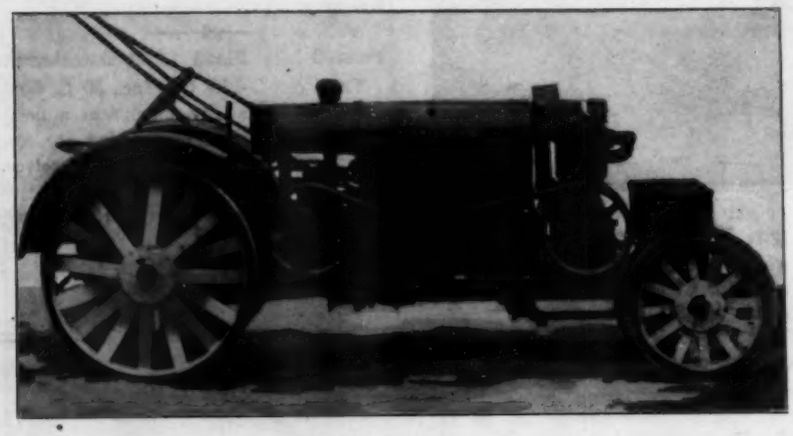
The reflector, which is 10 inches in diameter can be taken off by removing a single knurled nut. A new type of burner is used which will not "carbon up," it is claimed. This burner is placed at a fixed focal point and requires no adjustment.

Self-Propelling Air Compressor

A Self-Propelling four wheel Air Compressor, capable of hauling heavy loads behind itself and move about under its own power, is being manufactured by the Pontiac Tractor Company, of Pontiac, Michigan.

The Compressor is a Qiuncy TypeW-4 of 124 cubic foot displacement, having a separate radiator with pump driven circulation. This holds the temperature of the air coming from the compressor 60 to 70 degrees below the temperature of compressors which are cooled from the motive power radiator. The Compressor has a three bearing crankshaft and force feed lubrication. This unit is controlled by a Penn unloader, with a hand unloader attachment. The Compressor with air tank and tool box are mounted on a frame which attaches to either the McCormick-Deering or Fordson Tractors.

Power is taken from the tractor to drive the compressor through the power take-off pulley, which has a clutch allowing it to be thrown into or out of gear at will. The "ahead" drive of the belt brings the belt tightener into the correct relation with the belt.



New Meriam Indicating Flow Meter is Welded by New Atomic Hydrogen Process

The Meriam Co., Cleveland, Ohio, have recently placed on the market a new type of indicating flow meter suitable for measuring the flow of air, gas, saturated or superheated steam, oils, and other liquids at any temperature, vacuum or pressure.

Primarily the meters are designed for high line pressures—1000 lbs. per square inch or even higher, but with slight modifications they may be used with equally satisfactory results on vacuum or on low pressures. Their operation depends upon the fact that the flow of the liquid or gas causes a loss of pressure along the pipe. To insure correct readings, an accurately-proportioned orifice-disc is placed in the path of the flow in the pipe, and two small tubes are connected to the pipe line, one on each side of the orifice disc. The difference in pressure between the two sides is recorded by the level of mercury, or other non-evaporating liquid of constant weight. Since there are no gears, springs, etc., it is evident that the meter gives unusually accurate results over long periods. The orifice-disc, being made of Monel metal, will not wear or corrode. It is obvious that the scale may be calibrated in cubic feet, barrels, pounds, gallons, or other quantities per hour if desired.

The construction of these meters presented some interesting features. In view of the very high pressures which must be dealt with in many cases, and to the inaccuracy which would be caused in the readings by even the smallest leakage under such circumstances, it was decided to weld all pipe-lines, valves, etc., in the meter connections instead of using threaded unions. After considerable experimenting with various types of welding, the new atomic hydrogen welding was used; and this method, it is stated, not only makes a perfectly solid and non-porous weld but also requires no extra grinding or finishing to give a clean finish.

The welding "torch" consists of a pair of adjustable tungsten electrodes between which the electric arc is maintained, and a tube and valve communicating with a cylinder of compressed hydrogen. The hydrogen is directed over the electrodes on to the work, thus covering the molten area of the work with an envelope of non-oxidizing gas and avoiding the usual "scaling" which takes place when metals are highly heated.

The welding plant used by the Meriam Co. for the construction of these flow meters is stated to be one of the first of its kind ever installed in Cleveland.

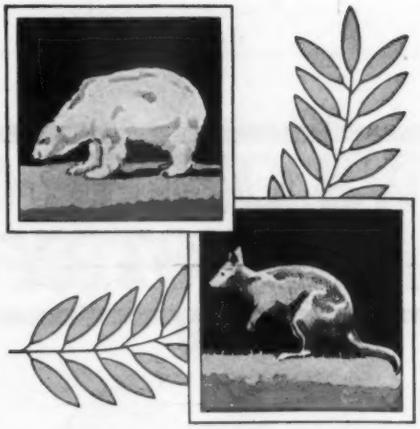
Improved TRIMO Pipe Wrench

The Trimont Manufacturing Company, Inc., makers of TRIMO pipe Wrench, announce the "Improved and Mightier" TRIMO now ready for delivery. The makers have directed every effort toward bringing about a material increase in strength and safety. Although the contour of the frame has been slightly extended, the appearance of the new TRIMO remains practically unchanged, and the parts of the old and new wrench are interchangeable throughout. The following features are claimed:

An entirely new and scientifically developed method of heat treating gives to the handle far greater strength and toughness than ever before. The swinging steel frame, has been strengthened to such a degree that breakage is virtually out of the question even under the most trying conditions.

As a further safeguard, overlapping side lugs, an integral part of the handle, brace the frame effectively against lateral distortion or spreading. The design of these reinforcing lugs furnishes a rugged safety feature without in any way hampering the action of the frame or adding to the bulk of the wrench.

The replaceable insert lower jaw and the popular nut-guards which protect the adjustment are economy and convenience features of the new, improved TRIMO.



From Nova Zembla to Cape Leeuwin

Welsbach

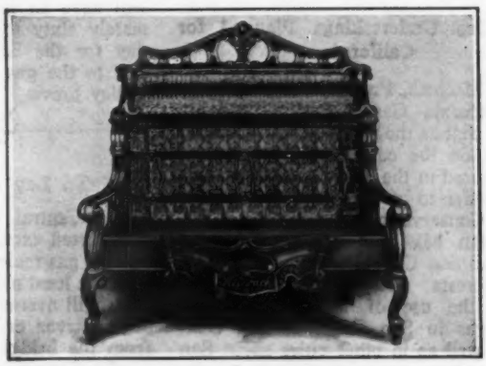
IN the land of Wattle Blossom and Wallabies the name Welsbach carries the same assurance of efficiency and service to the owner of the Sheep Station in Moree as it does to the householder in Ohio.

The mining engineer in Johannesburg has the same confidence in Welsbach as the tea planter in Ceylon. Wherever gas is used the name Welsbach is a passport with a world-wide visa.

For Welsbach workmanship knows no boundaries and fears no tests. In the Welsbach policy there is no substitute for thoroughness—no short cut to perfection.

In the Hotzone, Welsbach furnishes the gas companies of the United States a water heater that meets all conditions squarely. It is not temperamental. It makes itself at home anywhere. The Hotzone has a wonderful reputation for performing its duties year in and year out without attention. You do not have to open a column in the ledger headed "Upkeep." The profit on a Hotzone sale does not dwindle.

The radiant heater market offers a tremendous business for the gas companies that buy right. The need under present conditions is a line of radiant heaters that combine modest prices with designs which keep pace with public taste. Welsbach has been among the first to meet these needs. Welsbach has not been content to coast along on the overwhelming preference for products bearing its name. The Welsbach group of Radiant Heaters harmonizes with the modern trend in decoration and the prices match present-day pocketbooks.

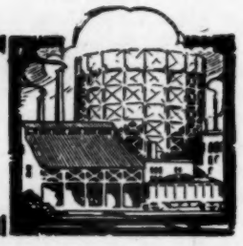


Member of American Gas Association

WELSBACH COMPANY

GLOUCESTER CITY, N.J. . . . *Offices in Principal Cities*

NEWS OF THE GAS INDUSTRY



Celebrate Seventy-Fifth Anniversary

The Indiana Gas Utilities Company at Terre Haute, Ind., recently celebrated the seventy-fifth anniversary of the Associated Gas and Electric System, of which it is a part, with a chicken dinner at the Elk's club there. More than 100 guests were present, all of whom were employes and officials of the company. One of the purposes of the dinner was to explain the value and desirability of the 5½ per cent 10-year maturity securities which have just been offered by the company and have been placed on the Indiana market.

Huge Gas Undertakings Planned for California

A. B. Macbeth, President of the Southern California Gas Company, has announced that as the result of many months of work on the conservation of natural gas produced in the oil fields of the State, and in order to co-operate with the Governor's Conservation Committee, a tentative plan has been presented to the State Railroad Commission by the major gas interests of California looking towards the use of large volumes of natural gas in San Francisco and Oakland, as well as in other cities about San Francisco Bay and cities along the route of the pipeline including San Jose and the city of Fresno and certain other cities in the San Joaquin Valley south of Fresno, including Visalia, Hanford, Tulare, Porterville, and others.

The general plan contemplates the organization of the Northern California Gas Company, which will be owned by the Pacific Gas and Electric Company, the Southern California Gas Corporation, and the Pacific Lighting Corporation. This Company, according to Mr. Macbeth, contemplates building two hundred and twenty miles of twenty inch pipeline from Buttonwillow, in Kern County, to San Jose. Transmission lines will be run eastward from this main line to the Southern California Gas Company's properties, lying in Tulare and Kings Counties, and to the Pacific Gas and Electric Company's properties in the vicinity of Fresno.

To supply gas for this line the Southern California Gas Corporation and the Pacific Lighting Corporation's interests plan to build a twelve inch line north from Ventura to Buttonwillow with a capacity of approximately twenty-five million cubic feet of gas a day. In addition to this the Pacific Gas and Electric Company is planning to make contracts for the purchase of additional gas from the Southern California Gas Company, and from the Milham Exploration Company operating in the Buttonwillow gas field.

Mr. Macbeth states that it is expected that the total cost of these lines, including those laid by Pacific Gas and Electric Company, and the necessary equipment, will be approxmately sixteen million dollars; and that these lines and equipment will have an initial capacity of approximately sixty millon cubic feet of gas a day for the San Jose terminal in addition to the gas used in the San Joaquin Valley towns.

To Lay 14 Mile Gas Main

The Central States Electric Company has started excavation for the laying of a 14-mile gas main which will connect Pella with the local plant at Knoxville, Ia. The ditch will average 40 inches in depth and at the river crossing will be suspended from the bridge. The work will require nearly three months and plans are being made to complete the Pella connectons and begin service early in December.

Natural Gas Corporations Chartered

Two natural gas corporations chartered under Pennsylvania laws to produce and distribute the product today filed certificates of statement and designation in the office of the secretary of state to enable them to do business in New York State. One company, Pennsylvania Fuel Supply Company is capitalized at $1,000,000 in $50 shares and the other, The Keystone Gas Company has a capital of $100,000 in $100 shares. T. B. Gregory is named as acting president of both corporations, the New York office of which is Olean, N. Y. Hastings, Hornberg & Andrews, Olean, are attorneys for both companies.

Valdosta Reduces Rate

The Valdosta Gas company has voluntarily reduced its rate from $1.85 to a minimum of $1.25 per thousand cubic feet.

Reduction of the Valdosta rate was made by officials of the company on the ground that the present rate of $1.85 per thousand prevents the general use of gas for household and industrial purposes.

The new scale starts with a minimum of $1.50 for the first 200 cubic feet; $1.40 per thousand for the next 1,800 cubic feet, and all remaining consumption at the rate of $1.25 per thousand. It has been accepted by the city government subject to the approval of the Georgia Public Service Commission.

The new rate quoted is lower than the rate charged in Waycross, Rome, Macon, Atlanta, Augusta or Albany, Ga., and is the lowest in the state except at Brunswick, where gas is drawn as a by-product from oil refinement.

The new rate will be put into effect as soon as the public service commission approves it.

City Wants Natural Gas if it can be Arranged

Although the city of Colorado Springs, first through the city council, and then by a vote of the people refused to sell its artificial gas plant to the Public Service Company of Colorado, but qualified its refusal by asking the Public Service Company to sell it natural gas at the city limits—the gas to come from the pipe line running from Amarillo, Texas, to Denver, nothing seems to have come of that, but October 30 has been named as the day for a conference between the city officials of Colorado Springs and officials of the Colorado Interstate Gas Company who own the natural gas pipe line, and it is given out in advance that the Springs is anxious to substitute natural gas for artificial gas if there is any advantage in doing so.

The artificial gas plant owned by the city has been a success from every angle, but if there is any way it can be bettered, the managers of the plant and the city officials are ready to take on the natural gas at the earliest moment possible.

The Advantages and Benefits
Obtained by
Dehydration of City Gas
by

THE "DRI-GAS" PROCESS

(Patent No. 1614347)

ARE NOW WIDELY RECOGNISED

21 PLANTS are AT WORK OR UNDER CONSTRUCTION

In all cases where Plants have been at work for periods of from six months to two years, there has been a considerable reduction in the number of consumers' complaints.

Full information may be obtained from

HOLMES COMPANY

and

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York.

Gas Main to be Extended

Extension of a gas distributing main from Schenectady to Saratoga Springs, estimated cost $195,000, will be accomplished by the New York Power & Light Corporation under approval by the Public Service Commission of construction and operation by the company in Ballston Springs and the towns of Milton and Ballston. This extension, when completed, will enable the company to abandon the water gas plant which now provides gas for Saratoga Springs, except for emergency purposes. It is also proposed to serve gas to residents along the proposed new distribution system.

Desires to Issue and Sell Bonds

The Atlanta Gas Light company, a subsidiary of the Georgia Power Company, has applied to the Georgia Public Service Commission for authority to issue and sell $2,304,000 principal amount of general mortgage gold bonds, 5% series, due 1967.

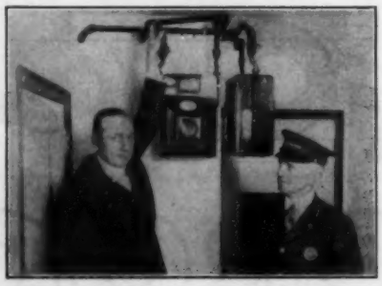
The proceeds derived from the sale or disposition of these bonds will, it is announced, be paid into the treasury of the company and will be used in re-imbursing it, in part, for expenditures made in refunding other refunding and improvement fifty-year sinking fund gold bonds, as well as for enlargements, extensions and additions to the property of the Atlanta Gas Light company.

Amended Tariff Approved

The Public Service Commission has approved an amended tariff of the Syracuse Lighting Co., effective October 1, by special permission of the commission for gas service supplied in city of Syracuse, villages of Liverpool, North Syracuse and Solvay and towns of DeWitt, Geddes and Onondaga and Salina. Schedule provides rate as follows for use of service for space heating from a gas fired heating plant whenever there is no other source of heat used. Other domestic uses may be included in residences. Available to applicants guaranteeing to use not less than 200,000 C. F. of gas per annum; $4 per year per 100 C. F. of maximum daily demand, plus 60c per M C. F. of gas used. Prior to January of first heating season during which service is used demand charge is payable 50c per month per 100 C. F. of maximum daily demand during that month. Thereafter the demand charge is payable at option of consumer: In advance, subject to a discount of 3%, or in equal monthly instalments during the months of October to May inclusive, or in 12 equal monthly installments payable throughout the year. Delayed payment excess 2%, but not less than 25c nor more than $10.

Chicago's 900,000th Gas Meter Goes Into Service

Chicago's 900,000th gas meter was put into service Wednesday, October 10. W. G. Rudd, Vice-President in Charge of Operation turned on the meter in the apartment of Fenton W. Barrett of the Edgewater Beach apartments at 5555 Sheridan Road. Unusual interest was attached to the ceremony because of the fact that since Mr. Rudd entered the service of our Company as a workman and years later became a Vice-President, great strides have been made in meter installations.



Anton May, Meter Reading Dept., Assists Mr. Rudd in this ceremonious turn on

During the twenty-three years of Mr. Rudd's service the Company has grown from 350,000 meters to the present high water mark of 900,000.

Natural Gas Likely for St. Joseph, Missouri

The Empire Gas & Fuel Company, a subsidiary of the Cities Service has petitioned the Missouri public service commission asking permission to build a natural gas pipe line into the city of St. Joseph, Missouri. If the venture is approved, connection will be made at Leavenworth, Kansas, with its Amarillo-Kansas City pipe line.

Gets Another Gas Well

Officials of the Ideal Cement Company of Denver were disappointed when drillers brought in an oil well on its property at Ada, Oklahoma, where it has a large cement mill and were anxious for gas. However this oil, about 100 barrels daily, is being purchased outright by Sinclair. Since the oil well came in, three other wells were drilled and the three are gas wells, the last one completed at 1,300 feet and making 10 million cubic feet of gas daily. All surplus gas that is not needed at the cement mill is pinched back subject to requirements.

To drill this last well four hundred feet deeper might mean a gushing oil well, but the cement officials want gas and will not drill, saying that the gas is more valuable to them than oil.

Natural Gas News In Rocky Mountain Regions

The Rocky Mountain Oil and Gas Association will hold its convention in Casper, Wyoming, November 14-15 and it will be the first meeting of the parent association since 1924. At the same time, the development and engineering division of the American Petroleum Institute will hold its meeting and a joint session will be called. "Conservatism" will be the main topic.

A mechanic for the Kinney-Coastal Oil Company went down 168 feet in a well with a strong gas odor, worked half an hour, wore no gas mask and came back as though he had been working on the surface.

The natural gas service for Durango, Colorado, which is to come from the Ute reservation is said to be practically inexhaustible. This ought to make a good market for gas appliances as Durango is a growing city. There is already mentioned, a smelter for the mining industry and a glass making plant, both the result of getting the excellent heat known to come from natural gas.

Although the voters of Omaha, Nebraska, refused to grant authority to issue bonds to bring in natural gas from Amarillo, Texas, it is understood that the big oil concerns back of the venture are contemplating bringing the gas in at their own expense, if the franchise is granted. They are sure that the service will be of such worthwhile value that the citizens will gladly seize the opportunity for natural gas, both for heating and cooking purposes. The Texas Corporation and the Skelley Oil Company are mentioned as working toward the end mentioned.

To Prevent Waste

Governor Dillon, of New Mexico, has been asked by B. F. Pankey, land commissioner of that state, to endeavor to have the next legislature create a geology department or some agency which would have jurisdiction over the operation of oil and gas wells within the state. This suggestion is made so as to thwart any carelessness, which boiled down means waste.

Big Gas Business Expected

The Public Service Company of Colorado is spending considerable for the laying of 20 inch pipe in parts of the business and industrial section of Denver, and this is indicative of some contracts for a large amount of natural gas. The pipe line between Denver and Amarillo has a capacity of 80 million cubic feet daily and there is plenty of gas to make the run whenever it is demanded.

Power Plant Practice

applied to a

Domestic Gas Burner

The Roberts Automatic Gas Burner Unit, the only atmospheric gas burner having air-gas ratio controlled and directed *into the burner* to points of combustion, follows out the best practice employed in big power plants to secure the maximum of heating value when and where most needed.

Special Radiants give

Highly Radiant Heat

not obtainable with other materials

SAFETY

insured with the

Roberts Safety Pilot

in case of gas or electric failure

This one feature alone, lifts the Roberts Automatic Burner out of the ordinary gas burner class. Let us tell you in detail how it operates.

Proven Record on Manufactured. Mixed and Natural Gases.

THE ROBERTS GAS BURNER CORPORATION

Jackson Building 128 W. Chippewa St. Buffalo, N. Y.

Seeks to Extend Mains

The Westchester N. Y. Lighting Company has made application to the Public Service Commission for authority to extend its gas distributing system from Mt. Kisco into Bedford township and serve residents with gas, under terms of a local franchise granted by the town board on August 20 last.

International Coal Conference

An outstanding event in the winter convention season will undoubtedly be the Second International Conference on Bitumnous Coal which is to be held under the auspices of the Carnegie Institute of Technology, in Pittsburgh, November 19 to 24. The leaders of technical thought from all parts of the world will be present in person to deliver addresses and participate in the discussion. Over sixty of the scheduled speakers will come from outside of the United States. Almost all phases of carbonization of coal will receive attention. Attendance at the meetings and participation in the conference are open to all interested.

American Standards Association Established by Unanimous Vote of Member-Bodies

Unanimous approval by the thirty-seven member bodies of the establishment of the American Standards Association to succeed the American Engineering Standards Committee, is announced by William J. Serrill, assistant general manager of the United Gas Improvement Company of Philadelphia. Mr. Serrill was chairman of the Standards Committee, and now becomes president of the American Standards Association. One of the most important results of the abandonment of the committee form of organization will, according to Mr. Serrill, be a much greater degree of participation by trade associations in the direction of the national industrial standardization movement.

One of the first acts of the Association will be the organizaton of a board of directors composed of twelve industrial executives. This newly created board, which was established in recognition of the increasing part which executives are playing in the standardization movement, will control the general administration and policies of the Association. The old Main Committee, made up of representatives of all the member-bodies, now becomes the Standards Council, and in its hands will rest all matters connected with the adoption and approval of national standards.

The officers of the Association are, in addition to Mr. Serrill: vice-president, Cloyd Chapman; secretary, P. G. Agnew; and assistant secretary, F. J. Schlink. The Advisory Committee of Industrial Executives includes: J. A. Farrell, president of the U. S. Steel Corporation, chairman; George B. Cortelyou, president of the Consolidated Gas Company; John W. Lieb, senior vice-president of the New York Edison Company; L. F. Loree, president of the Delaware & Hudson Company; and Gerard Swope, president of the General Electric Company.

Value of Gas Meters and Water Meters Manufactured in 1927

The Department of Commerce announces that, according to data collected at the biennial census of manufactures taken in 1928, the establishments engaged primarily in the manufacture of gas meters and water meters in 1927 reported products valued as follows: Gas meters, $12,202,621; water meters, $11,669,596; and all other products (including gas machines, gas regulators, and parts and accessories), $12,842,973; making a total of $36,715,190. This total represents an increase of 7.1 per cent as compared with $34,292,059 reported for 1925, the last preceding census year.

Of the 58 establishments reporting for 1927, 11 were located in Pennsylvania, 9 in New York, 7 in New Jersey, 6 in Illinois, 6 in Ohio, 4 in Indiana, 3 in Massachusetts, 2 in California, 2 in Maryland, and 1 each in Connecticut, Florida, Kansas, Kentucky, Michigan, Rhode Island, Texas, and Wisconsin. In 1925 the industry was represented by 61 establishments, the decrease to 58 in 1927 being the net result of a loss of 9 and a gain of 6. Of the 9 establishments lost to the industry, 3 went out of business prior to 1927, 3 were idle throughout the year, and 3 reported commodities other than gas meters and water meters as their principal products and were therefore transferred to the appropriate industries.

Conference Approves Commercial Standard for Unions

Approval of a proposed commercial standard for malleable iron or steel screwed unions for use with standard weight pipe, was given September 24, 1928, by a general conference of interested elements of the industry. This conference was held under the auspices of the Commercial Standards Unit of the Bureau of Standards, Department of Commerce This commercial standard pertains to black and galvanized types of brass seated malleable iron or steel unions.

The conference agreed that new production, in accordance with the schedule as defined by the standard, would begin on May 1, 1929, allowing until November 1, 1929, for industry to use up existing stocks. The standard will be subject to annual review by a standing committee, in order that it may be kept abreast of such changes as may take place in the art. Members of this standing committee are: Robert E. Bryant of the Jefferson Union Company, Lockport, N. Y.; Myron H. S. Affleck of the Star Manufacturing Company, Providence, R. I.; Stanley G. Cady of the Rhode Island Fittings Company, Providence, R. I., representing the manufacturers;—The Standard Sanitary Manufacturing Company, Fleck Brothers of Philadelphia, General Fire Extinguisher Company, Hajoca Corporation of Philadelpha, representing the distributors;—the Master Plumbers Association, the Master Steamfitters Association, American Gas Association, the Heating and Piping Contractors National Association, representing the consumers.

The Department of Commerce has prepared the standard for submittal to industry for signed acceptance. At least 65 per cent of the industry, by volume of annual production, must accept the standard in writing, and with no outstanding opposition from the others, before it will be published and recommended by the Department.

American Light & Traction Co. Buys Milwaukee Coke & Gas Co.

The American Light and Traction Company, controlled by the United Light and Power Company, announces in connection with the earnings report for the September quarter that it has acquired the capital stock of the Milwaukee Coke and Gas Company in exchange for its own stock, which was taken at a valuation of $200 a share.

Commission Approves New Schedules

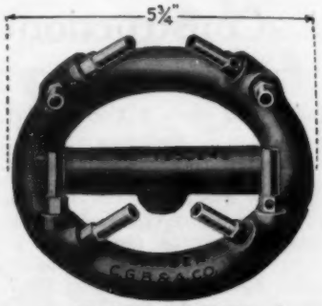
The following new gas schedules have been approved by the Public Service Commission.

Niagara Falls Gas & Electric Co.—Gas service supplied in city of Niagara Falls. Schedule effective November 1, 1928, provides block rate as follows for use of service for light, heat and power: First 200 C. F. or less $1.50; next 3800 C F 10c per 100 C. F.; next 5000 C. F. 8c per 100 C. F.: all over 9000 C. F. per month 6c per 100 C. F. Minimum charge $1.50 per month per meter. Delayed payment excess 2c per 100 C. F. Effects reduction for all consumption in excess of 4000 C. F. per month.

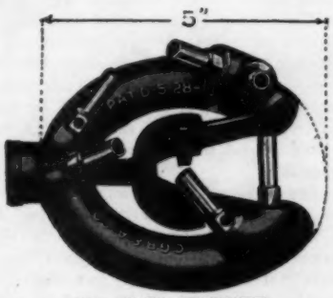
Saugerties Gas Light Co. Gas service supplied in village of Saugerties. Schedule effective November 1, 1928, provides a new classification for use of service for light, heat and power, available to applicants who will guarantee a minimum monthly bill of $4 where service is taken for not less than 12 consecutive months, or $6 per month where service is taken for less than 12 consecutive months, but not less than 2 consecutive months. Rate is block (per M. C. F.) $2.10 for first

BARBER PATENTED JET GAS BURNERS

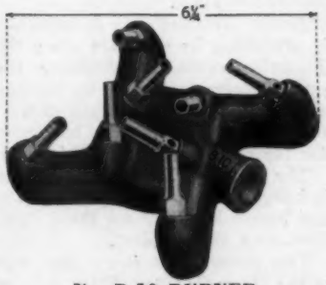
Best by Test for Water Heaters—



No. S-15 BURNER



No. K-50 BURNER



No. B-10 BURNER

Why?—Because Barber Burners possess many outstanding and exclusive features that make them highly dependable, efficient, and free from service troubles. The economy, reliability, and superior service rendered by Barber Burner equipped gas appliances have built up a powerful consumer demand for them—reducing sales resistance to an absolute minimum.

Insist upon Barber Burner equipped Water Heaters and other Appliances—watch your sales increase, profits grow, and service troubles disappear.

Among the many Manufacturers who have adopted Barber Burners as standard in their Water Heaters, and other Appliances are the following:

Akron Equipment Co.
American Radiator Co.
Arthur & Fowler Co.
Bean Spray Pump Co.
Bryan Steam Corp.
Carrier Engineering Corp.
Carrier-Lyle Corp.
Champion Dish Washing Machine Co.
Coast Heater Mfg. Co.
Cole Mfg. Co.
Dahlquist Mfg. Co.
Day & Night Water Heater Co.
Economy Heater Co.
Electro Weld Co.
Firestone Tire & Rubber Co.
Franklin Plumbing Supply Co.
R. E. Fraser & Co.
General Gas Furnace Co.
Geneva Heater Co.
Gewert Mfg. Co.
E. A. Hibbs
Hoffman Heater Co.
Hollywood Water Heater Co.
Hotstream Heater Co.
Hoyt Heater Co.
Edward Katzinger Co.
Lovekin Water Heater Co.
Marlow Manufacturing Co.
McCann-Harrison Co.
Merit Mfg. Co.
Walter Mork Co.
Newell Mfg. Co.
New Way Mfg. Co.
Northwestern Steel & Iron Works
Ohio Heater Co.
Geo. F. Reichman & Co.
Safety Water Heater Co.
Sands Mfg. Co.
Schwab Boiler & Machine Co.
Snap-O-Stat Co.
Star Dee Water Heater Co.
Stinson Sales Co., Inc.
John Trageser Steam Copper Works
United Heater Corp.
Vernon Edler Corp.
Ward Heater Co.
Weil-McLain Co.
Welsbach Co.
D. D. Wessels & Sons Co.
Williams Foundry Machine Co.
Wise Furnace Co.

TO MANUFACTURERS: The services of our Engineering Department and Testing Laboratory are at your disposal for determining the correct application of Barber Burners to any type of heating device. Write us today.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

$1.40 for next 10,000 C. F.; $1.30 for next 30,000 C. F.; and $1.10 for all over 50,000 C. F. per month. Minimum charge $4 (net) per month per meter for yearly customers and $6 (net) for seasonal customers. Where no gas is consumed in any month no minimum charge will be made. Prompt payment discount 10c per M. C. F.

Everett, Washington, Company to Occupy New Quarters

The Everett Division of the Washington Gas and Electric Company have just leased a new office location at 2926 Colby Avenue.

There will be connections provided for the installation of gas fired refrigerators in the window, either of the self-maintained unit or the remote operating unit. All the gas appliances connected in the office will also be vented so as to be able to operate an appliance under conditions similar to which they are installed.

The accounting department location is such that it will not be necessary to have a high screen around the counter and thus everything will be open to the public.

The heating plant will consist of a gas fired steam boiler, installed in a furnace room, so that this furnace room will be similar to any that one might find in a home.

It is anticipated that the company will be in its new location by January 1st, 1929, when there will be an appropriate opening.

Commission Seeks Appropriations

The Indiana public service commission will ask the general asembly for appropriations of $352,500 for the next two years, it has been learned.

The budget will contain a request for authority to establish a $100,000 revolving fund, to be accumulated out of fees paid to the commission, and to be used for exigencies of the commission's work, such as salaries for counsel and for employment of two engineers and two auditors to take the initiative in behalf of consumers in obtaining rate reductions.

Personals

Clare N. Stannard, vice president and general manager; V. L. Board, general superintendent; George H. Shaw, general counsel, and George L. McKillip of the Public Service Company of Colorado are making an inspection of the natural gas pipe line between Denver and Amarillo, Texas, and from Amarillo the party will move into Oklahoma and Kansas. Mr. Stannard said:

"It is our aim to study all the latest methods of production and to familiarize ourselves with the details so that the practices can be applied to the production and transportation of natural gas for Denver." At present, that is before the cool weather set in, Denver was using about six million cubic feet of natural gas daily, but that will increase as many will use the gas for heating purposes.

Mr. Stannard emphasized the fact that everything is being looked into so that the service which is entirely satisfactory may not be impaired during the wintry weather.

Wm. H. Matlack has been appointed advertising manager of the Southern Illinois Group of the Illinois Power and Light Corporation with headquarters in the Spivey Building, East St. Louis, Illinois. Aside from handling the advertising for the four Divisions comprising the group he will look after the store and window displays in about thirty district offices.

E. R. Bradbury has succeeded William Neish as manager of the San Angelo office of the Oklahoma Natural Gas Corporation, the date of the succession being Oct. 1. Mr. Bradbury is formerly of Okmulgee, Oklahoma, having worked for the same corporation there, to be succeeded there by Mr. Neish. J. H. Moreland left last spring to take charge of the Oklahoma City office of the same concern.

Mr. Bradbury has been with the Oklahoma Natural Gas Corporation for the last six years.

T. A. Wood who has been field superintendent for the gas corporation in San Angelo for nearly a year, is now being transferred to Okmulgee, Oklahoma

After supplying San Angelo with Natural Gas for one year there are now 3,000 meters on the local lines distributing the natural fuel.

E. B. Spike, salesmanager at the Beverly, Massachusetts, Gas and Electric company has been made salesmanager at the Gloucester Electric company, a Tenney managed Company. Mr. Spike made a splendid record with the Beverly Company. Charles W. Caldwell succeeds Mr. Spike.

D. J. Clements of Weedsport succeeds R. H. Erness as local manager for the Empire Gas and Electric Company and has taken charge of the office. Mr Erness has been transferred to Geneva

Walter F. Norton, Superintendent of the Gas Dept. of the Nashua District, Public Service Co. of New Hampshire, has been made District Manager of the Nashua District.

Walter E. Vaughn of the Sauganash Investment Company, a company which is affiliated with the Iowa Southern Utilities Company, a Delaware corporation, spoke on the installation of gas plants at Wausau, Rhinelander and Merrill. He informed the council members that he has been connected with the Rhinelander company as manager since 1915 and previous to that time he was gas plant manager at Wausau. It was his mission to answer any inquiries which might come from the council or the citizens. A question regarding the cost of city gas for cooking resulted in Mr. Vaughn saying that for cooking only for the average family of four will cost about $3 and for all domestic purposes including laundry, it would cost about $4.50 per month.

Arthur B. Ayres of Newcastle, Ind., a large owner of gas properties in Indiana, has sponsored the city band there and has announced that he will erect a municipal bandstand in Newcastle if a suitable location can be found for it.

Trade News and Construction

United Engineers & Constructors, Inc. Activities

The Public Service Electric & Gas Co., will have installed a U. G. I. Mechanical rate generator on the carburetted water gas apparatus in its Camden, N. J. plant.

Central Public Service Company whose main office is in Chicago, Illinois, has contracted for the installation of a Carburetted Water Gas Apparatus with Chrisman Cycle in its Lincoln, Neb. plant.

The Dixie Construction Company has placed an order for the installation of a 9'0"x25'6" U. G. I. high duty condenser, together with necessary by-pass and connections. This condenser will be capable of cooling gas at the rate of 3,500 cu. ft. per day and will be installed in Charleston, S. C.

Des Moines Gas Company has placed an order for the installation of two U. G. I. 4-pass High Duty Condensers. These condensers will have a capacity to cool 6,000,000 cubic feet of gas daily. The condenser water will be used in a circulating system for heating holders during the cold weather.

Jersey Central Power & Light Company is projecting its gas lines along the New Jersey coast to accommodate the fast growing resorts within its territory. It now contemplates the laying of a 6" main to Seaside Heights and has contracted for the equipment and do this work.

The Yankton S. D. Light & Heat Co., is being furnished with a Chrisman Cycle and Steam Manifold for the 4 ft. U. G. I. Apparatus at this plant.

The carburetted water gas apparatus at the Norwalk Conn. Plant is being converted from hand to hydraulic and automatic operation. This is being done by the installation of the necessary hydraulic cylinder equipment and a Model B Automatic Control. The Norwalk Plant is controlled by The Connecticut Light & Power Company.

Repeat Orders already received prove that

HOMESTEAD FIRES

are developing a *real* volume of fireplace business for the Gas Companies offering them for sale

Perry Joins Milburn Company

Mr. S. W. Perry of Monmouth, Illinois, who formerly represented the DeVilbiss Company of Toledo, has joined the sales organization of the Alexander Milburn Company of Baltimore to especially travel the Middle Western Territory.

Mr. Perry has long been identified with the Paint Spray, Automotive, Welding and cutting, Portable Light and Engineering Equipment fields.

Boone County Coal Corporation Announces Changes in Sales Organization

The Boone County Coal Corporation announces the employment of F. C. Wellington, of Springfield, Illinois, who will enter the organization of this company as Sales Engineer for their Boone-Chilton gas coals. Mr. Wellington has resigned his position as Engineer and Superintendent of the Springfield plant of the Illinois Power Company, which position he has held for a number of years. His long experience in gas manufacture and engineering should prove of value in this new field.

Russell W. Wilmoth, who has represented this company in the Eastern territory for the past several years, has been promoted to Manager of Gas Coal Sales.

Semet-Solvay Engineering Corporation Erecting Welded Steel Purifier at Phoenix, Other Contracts Received

A two compartment Steere welded steel purifier is being built for the Central Arizona Light and Power Company at Phoenix. The purifier box will be 44' long, 30' wide and 13' high. It will be equipped with two layers of trays, each supporting five-foot layers of oxide. The unit will allow for the adding of additional boxes on either end. All seams will be welded inside and out and the purifier and 24" welded steel manifold and valves will be submitted to the most rigid tests for tightness far exceeding working pressures. Oxide will be handled with the assistance of an elevator and a gantry crane will raise and lower the covers of the box.

The Montreal Light, Heat and Power Consolidated has ordered four Steere expansion joints to be installed in the La Salle Gas Works. The joints will be tested for tightness against gas leakage at 120 pounds per square inch. The working pressure will be 75 pounds.

There is being built a system of four collector mains for the Brockton Mass. Gas Light Company. Each will be 13' x19" wide and 4' deep, built of welded steel and fitted with Steere gate valves.

The Pawtucket R. I. Gas Company faces its heavy winter demand for gas consumed in industrial and house heating with new manufacturing equipment. An 11' Steere water gas machine has just been completed and put into service. It is equipped with a Backrun and will use coke manufactured on the plant for generator fuel.

The Semet-Solvay Engineering Corporation of New York is furnishing a new coal handling system for the Pittsfield Coal Gas Company. This equipment will enable the operators to handle 20 tons of coke an hour. A storage bin of 36 tons capacity will be erected. A Steere charging machine will be served direct from the storage bin chute making the fueling 100 per cent automatic. The charging machine will be protected with a safety switch which will prevent the opening of the hopper door unless the generator is tightly closed.

Gas Machinery Company Awarded Contract for New Water Gas Plant at Worcester. — Other Construction Activities

Contract has been awarded for a new water gas plant to be erected on the site of the old coal gas plant in Worcester, Mass.

The old buildings and equipment have almost all been moved and foundations for the new plant are being started.

The new equipment will consist of two 11' carburetted water gas sets with automatic controls, waste heat boilers, exhaust steam accumulator, and auxiliary equipment, which will be placed in a new building.

Adjoining the generator building, will be a new boiler room including two 350 H. P. water tube boilers with superheaters, chain stokers, blowers, and auxiliary equipment.

On the other side of the new generator room will be erected a new machinery room for the exhausters, tar extractor, pumps and gas compressors.

The balance of the equipment includes fuel and ash handling equipment for the water gas apparatus and boilers, cooling scrubbers, water cooling tower, purifiers, station meter and yard piping.

The new plant is all arranged for future extension and the present water gas plant will be maintained as a reserve.

Contract has been awarded to furnish and erect a new five foot Carburetted Water Gas Set in the plant at Rochester, N. H.

This new water gas equipment will be equipped with all up-to-date appliances, including apparatus for using exhaust steam in the generator.

The New York and Richmond Gas Co. has contracted for the erection of one rectangular steel purifier, with supporting structure valve manifold, gantry drane, oxide elevator and conveyor, additional welded steel pipe and fittings.

This equipment is in line with the expansion program which the New York and Richmond Gas Co. started a year or so back, to take care of the rapidly growing needs of Staten Island.

The New York State Gas and Electric Company has contracted for the installation of new byproduct equipment at Onconta, N. Y.

The machinery includes one No. 5 Roots Exhauster and Connections, one Water gas tar washer and bypass, one balance governor and bypass, one water gas blower and twelve inch, ten inch and eight inch gas connections.

This work is part of the expansion program taken by the New York State Gas and Electric Company to increase capacity of the plant so as to take care of the increased load.

E. L. Phillips & Company have contracted for installing Breeze Collectors for all of the Water Gas Sets and Waste Heat Boilers at their Rockaway Park, Long Island Plant.

There is being installed one 5' Water Gas Set, Condenser, Bypass, Tar Washer Bypass, two 12x12x12 Purifiers, one Station Meter Bypass and Connecting Yard Piping, for the new gas plant which is being erected in Lexington, by Mr. N. H. Gellert of the Atlantic Gas Co. of Philadelphia, Pa.

This plant will serve Lexington, N. C., and Thomasville, N. C. upon completion of the new plant laying the necessary mains.

The Sanford, Florida, Gas Co. has contracted for one 5' Carburetted Water Gas Set, Operating Floor Stairway, to take care of the increased load for the City of Sanford.

Western Gas Construction Company Construction News

A contract has been placed for furnishing one Koppers type naphthalene absorber, complete with automatic oil measuring and meter device, absorber to have a capacity of 6,000,000 cubic feet of gas per twenty-four (24) hours. This equipment is being installed at Wilmington, Del.

The United Light & Power Engineering and Construction Company of Davenport, Iowa, has placed an order for one 8'0" x30'0" Smoot steam accumulator for erection at Cedar Rapids, Iowa.

The Western Gas Construction Company has been awarded a contract for furnishing 4-welded steel purifiers carried on steel superstructure, each box will be 36'0"x40'0"x12'0" deep with steel plate covers, side doors and two layers of trays. These boxes are designed to operate at five (5) pound pressure. There will be a gantry crane carrying an oxide elevator and conveyor operating on a track over the entire four boxes. These purifiers will be equipped with a 20" manifold piping, so arranged to permit the operation of the boxes in series or omitting any particular box or operating the boxes in parallel. The purifiers are to be erected for the Ohio Fuel Gas Company at Toledo, Ohio, at their new plant, on the corner of Front and Wheeling Streets.

The Portsmouth Gas Company, Portsmouth, N. H., through the Central Public Service Corporation of Chicago, Ill. has awarded a contract to furnish and install one welded steel purifier box of three compartments, each compartment will be 7'10"x11'4"x11'0" deep with steel plate covers. The purifier will be equipped with side doors, two layers of trays, 10" circle series connections and cover hoist. There will also be included with the purifier a condenser, bubbling washer, tower scrubber and bypasses for same.

THIS makes *water heater* VALUE

... the basis on which comparisons should be made...

THE VALUE of a water heater is determined by the kind of service it will render, the monthly cost of operation, the length of its life, and its safety. The price of the heater itself is of minor importance in the making of value—yet, too often, price gets first consideration.

You'll find that your customers are more vitally interested in the monthly cost of safe, dependable hot water service than in first cost—and when shown the many advantages and economies of the Humphrey, will quickly realize that, although it costs a little more to buy, it is vastly cheaper to own.

HUMPHREY
AUTOMATIC GAS WATER HEATER

A SIZE AND TYPE FOR EVERY PURSE AND EVERY PURPOSE

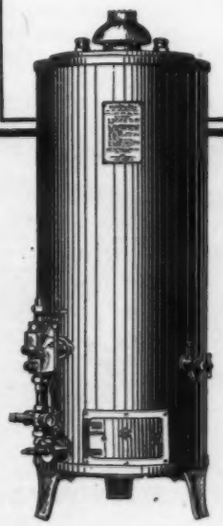
HUMPHREY COMPANY
DIV. RUUD MFG. CO.
KALAMAZOO, MICHIGAN

Service
always ample and pleasing

Efficiency
low monthly operating cost

Durability
low yearly ownership cost

Safety
that is complete



Call in a Humphrey Merchandise Man. Let him explain how Humphrey advertising and selling cooperation will increase your gas sales through increased water heater sales.

Electrolux Wins Another Award

Word has been received that Electrolux has won another award abroad, this time at the Trade Fair and Exhibition, Douglas, Isle of Man. A gold medal for hygiene was given for Electrolux refrigerators exhibited. The honor makes the fourth that has come to Electrolux in about one year. At the recent Exposition Internationale du Comfort d'Habitation at Liege, Belgium, Electrolux was given the diploma, "Membre du Jury Hors Concours." Last year a coveted diploma was received at the Third International Exhibition in Fiume and also a gold medal, and Grand Prix. Early this year Electrolux was awarded a gold medal and Grand Prix d'Honneur in Madrid during the Feria de Navidad (Christmas Fair).

Munnikhuysen Appointed District Engineer of Koppers Construction Company

"Walter F. Munnikhuysen has been appointed District Engineer of The Koppers Construction Company, with offices at 823 Peoples Gas Building, Chicago, Ill."

Consolidated Ashcroft Hancock Co. Inc. Change Chicago Address

Consolidated Ashcroft Hancock Co., Inc. announce the removal of their Chicago Office to 605 W. Washington Boulevard, effective November 15th. This office will house also the staff of American Schaeffer & Budenberg Division, recently consolidated with the above. Mr. G. A. Bins, formerly General Sales Manager of American Schaeffer & Budenberg Corporation has been appointed Sales Manager in charge of the Western Industrial Division with headquarters in Chicago. The Western Division will handle the business of the Company in all of that part of the United States and Canada, west of a line drawn from Toronto, Ont. to New Orleans, La. The Company requests its customers and prospects located in this western section in the future to direct their correspondence to Chicago.

Complete stocks will be carried of Ashcroft and American gauges, Consolidated and American Safety and Relief Valves, Hancock Valves and Inspirators, and American Industrial Instruments.

A central repair and service department has also been established in Chicago.

Mears-Kane-Ofeldt-Inc. Employ Sales Engineer for Philadelphia District

Mears-Kane-Ofeldt-Inc., announce the appointment of Herbert H. Etter as sales engineer for the Philadelphia district comprising Eastern Pennsylvania, Southern New Jersey, Delaware, Baltimore, and Washington.

Mr. Etter is a graduate of Drexel Institute, and has been employed as an Industrial Sales Engineer since his graduation. He was employed for several years by the Public Service Electric & Gas Company of Newark, N. J. before entering the employ of the Philadelphia Gas Works Company from which company he resigned to accept this appointment.

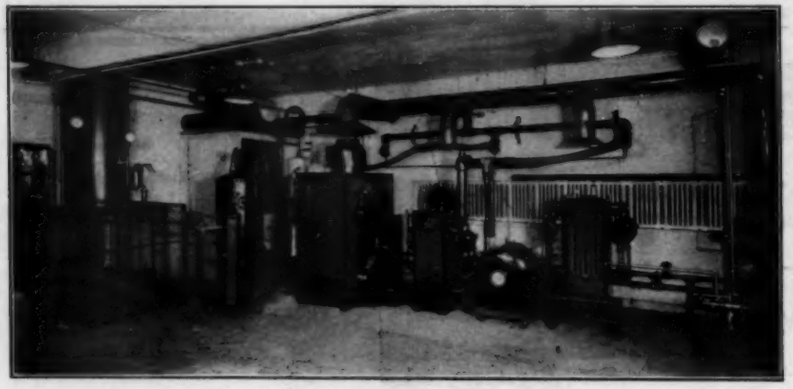
Mr. Etter will make his headquarters at the home office in Philadelphia.

The Bryant Heater & Mfg. Co. Increases Its Research Laboratory Facilities

The Bryant Research Laboratory formerly located in the Bryant factory, 17825 St. Clair Ave., Cleveland, has been moved to larger quarters on East Sixty-Second Street in the same city.

At the new laboratory Major W. E. Stark, Research Engineer, and his staff will have at their disposal complete facilities for the testing of gas heating equipment with both manufactured and natural gas, the latter being an unusual advantage afforded by the new location. The laboratory represents an investment of $20,000, devoted to the purpose of giving the user of gas heating the best value for his money and enabling gas companies to develop the house-heating market with equipment which will simplify both their selling and servicing problems.

The test floor is equipped with gas, water, steam and vent piping adequate for working with four boilers simultaneously. Equipment includes accurate gas meters, gas calorimeter, iodine pentoxide apparatus for precise determination of carbon monoxide in flue gases, Morehead apparatus for fuel and flue gas analysis, sensitive pressure and draft gages, recording instruments of various types, pyrometry equipment and an air compressor for use in feeding boilers for test at a uniform rate and for investigating resistance of appliances to flow of gas. All steam, gas and water connections for boilers under test can be made with flexible hose as a time-saving measure. The heating plant for the laboratory building is also equipped for experimental work.



A portion of the Bryant Research Laboratory

STATEMENT OF THE OWNERSHIP, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published Monthly at New York, N. Y. for October 1, 1928.

States of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher American Gas Journal, Inc., 53 Park Place, New York; Editor, H. M. Riley, Flushing, N. Y.; Managing Editor, H. M. Riley, Flushing, N. Y.; Business Managers, S. G. Krake, Jamaica, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

S. G. Krake, Jamaica, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

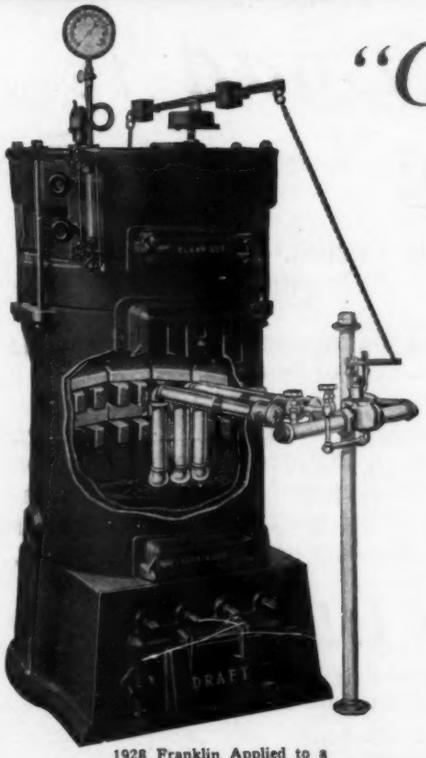
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

S. G. Krake,
Manager

Sworn to and subscribed before me this 26th day of September, 1928.

[Seal.] B. F. McCarthy
(My commission expires March 30, 1929.)



1928 Franklin Applied to a House Heating Boiler

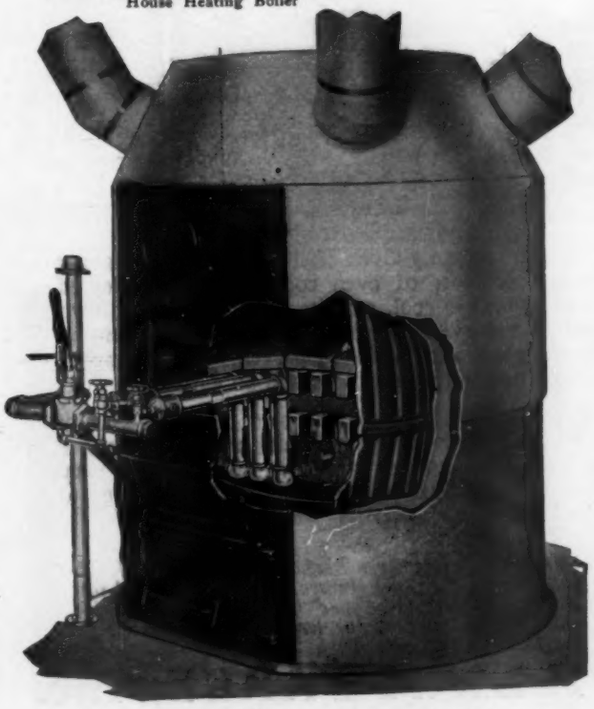
"Get into the... Game with Both Feet!"

"Progress can only continue in the gas industry as a result of satisfactory utilization. To assure this, gas utilities have only one course, they must 'get into the appliance game with both feet.'"

Excerpt from paper read at Annual Convention of Pacific Gas Association by Clyde H. Potter, Southern Counties Gas Co.

Sound advice this. And profitable too if you feature

The *New 1928 Improved* FRANKLIN Gas Burner



1928 Franklin Gas Burner Applied to Hot Air Furnace

The Franklin easily, quickly and thoroughly converts the coal stoked furnace or boiler, into a competent and economical heating system to suit the pocketbook and requirements of the modern householder.

Many years of experience in the best methods used in the combustion of gases have enabled Franklin Engineers to perfect this new up-to-the-minute Franklin Burner.

Automatic regulation of air assures intense blue flame under all conditions. Burns natural or artificial gas or their combination. Flame will not extinguish on low pressure. No backfiring in the mixer. Approved by the fire insurance companies.

The success which has followed the placing of the Franklin on the market, is proof of the correctness of the basic principle upon which the design was formulated.

There is profit and satisfaction in the sale of the New 1928

FRANKLIN GAS BURNER

Get your Share

Patented and Manufactured Exclusively by

THE FRANKLIN GAS APPLIANCE COMPANY

Cincinnati, Ohio.

"The Cooking Load is Dwindling"—

This warning was given in an article by Mr. J. L. Farrell, of the Public Service Co., of New Jersey, in the A. G. A. Monthly.—

Home cooking has not lost any of its zest. The menfolk enjoy good home cooked food just the same as ever. But the womenfolk are not so keen on preparing the daily meals as formerly.

They dread the hazard of burned fingers, wrists and hands. They fear spoiling their dresses, greasing up the floor and range, when using the regulation oven shelf while roasting, baking or broiling.

Because of this danger and discomfort, home cooking is forced into competition with factory prepared foods, thus a lucrative source of income to the gas company is cut off for the want of a little investigation.

You Can Save It!

The effort required to again popularize home cooking and retrieve, in a great measure, the dwindling domestic load is small compared with the results to be gained. The remedy is contained in the following four words—

PARKE SAFETY OVEN SHELVES

Patented June 1, 1926, and Sept. 1, 1926

Write at once for further details.

The Parke Safety Oven Shelves remove the danger and discomfort of oven cooking. The patented handle, always cool, permits the shelf to be drawn out of the oven just far enough to give attention to the roast and broil and prevents the spilling of grease on the range or floor and on garments.

There's a big field for the sale of Parke Safety Oven Shelves as a separate unit and also for ranges equipped with them, as they represent the very last word in Safety, Comfort and Convenience to the housewife.

The Parke Safety Oven Shelves have been tested and approved by the Good Housekeeping Institute and the New York Herald-Tribune Institute, Modern Priscilla, besides some of the largest Gas Companies in the East.

WILLIAM PARKE, Inc.

537-549 So. Second St., Camden, N. J.

New York Office: 29 Perry St.

How the Kernit Meets the Five Requirements of an Incinerator

FOR an incinerator to be practicable for domestic use, it must meet certain major requirements:

First, *the incinerator should ensure complete incineration without objectionable odors.*

Second, *it should be so constructed that all the gases and fumes resulting from its operation will be carried up the flue, even though the incinerator is mishandled or overloaded.*

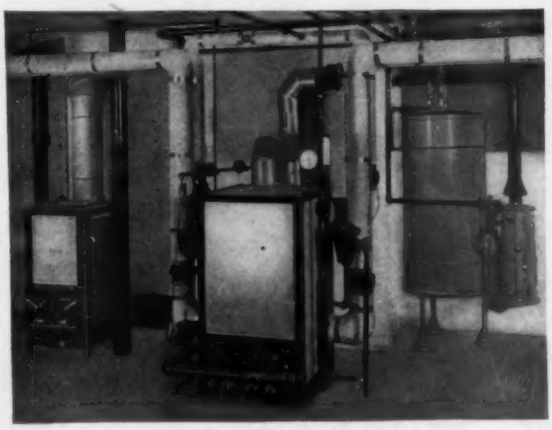
Third, *the incinerator when in operation should never become excessively hot on the outside.*

Fourth, *it should be economical in cost of operation.*

Fifth, *it should be of rugged construction to withstand hard usage and to eliminate frequent replacement of parts and servicing.*

The Kernit is designed to meet all these requirements. It is patented, all its essential features being exclusive to Kernit.

It embodies original features which ensure long life, economical and satisfactory performance, with a minimum necessity for renewal of parts or frequent servicing.



KERNIT INSTALLATION IN MODEL HOME

It is so clean and convenient

The Kernit is a quality product designed by experts on incineration problems.

Has been tested and approved by the leading gas company laboratories.

The more your customers become incinerator conscious the greater the demand for this modern waste disposal appliance.

The Kernit illustrated booklets, folders and display posters present the advantages of household incineration in a convincing manner.

We are prepared to co-operate with you to the limit.

KERNIT INCINERATOR COMPANY
AMPERE, NEW JERSEY

Tie-in... with Roper

ROPER
901 SERIES

Here's a sales winner that Roper customers are cashing-in on. New beauty—new refinements—beautiful white porcelain base band covers—no visible bolts, hinges or door catches.

For Real Values

This series of Roper ranges overcomes competition. The beauty—the many features—the price of this line—all combine to make it the greatest value offered today. Take full advantage of these real values—these greater selling features. Put new life into your merchandise sales.

Cash-In On Roper's Radio Broadcast

Here is a unique broadcasting program with sales advantages for you. It is selling the housewife on the joy of home cooking. It is telling the cooking story from a new angle—the health angle. And it is selling gas as the proper cooking fuel. 51,000,000 people live in the territory covered—over the Blue Network. The Forecast School of Cookery — an internationally recognized cooking authority is conducting the broadcasts—three times a week—for seven months. Play up this program in your newspaper advertising and cash-in on the benefits it will bring to you. This is Roper's contribution to the cause of gas.

GEORGE D. ROPER CORPORATION, Rockford, Illinois

Pacific Coast Branch: 135 Bluxome Street, San Francisco, Calif.

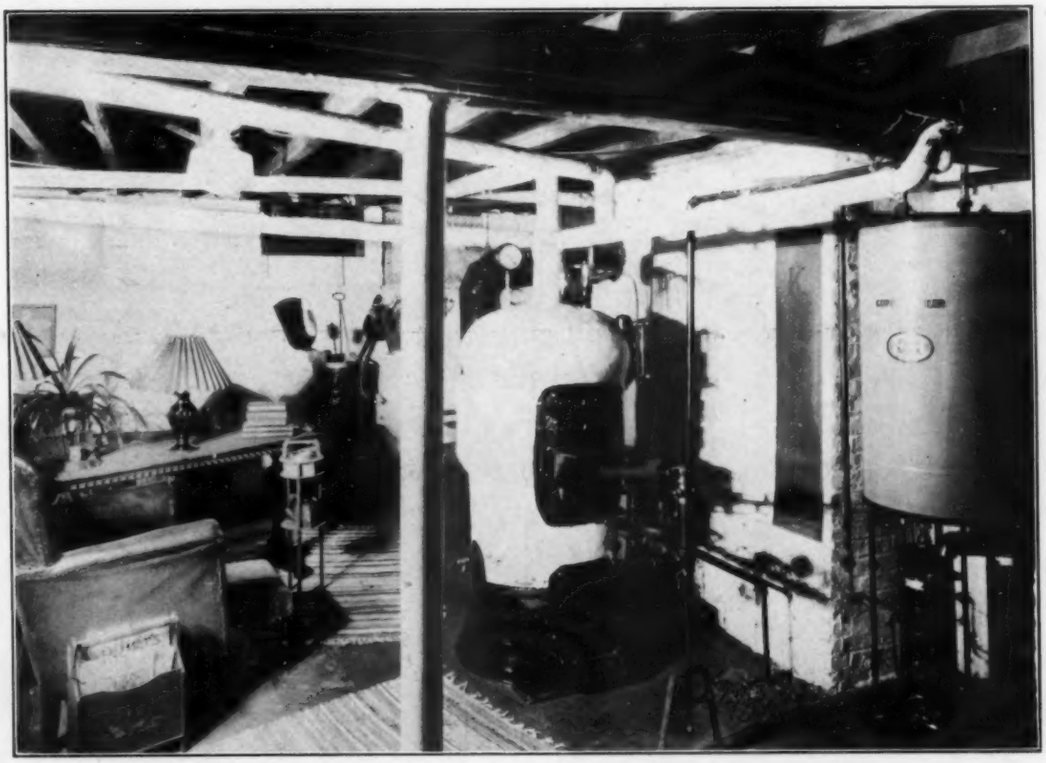
ROPER

GAS RANGES

Radiant Heaters—Gas Fired Furnaces

BE SURE THE ROPER PURPLE LINE—AND THE ROPER COMPLETE OVEN CONTROL ARE ON THE GAS RANGE YOU SELL

A Complete KOMPAK Installation

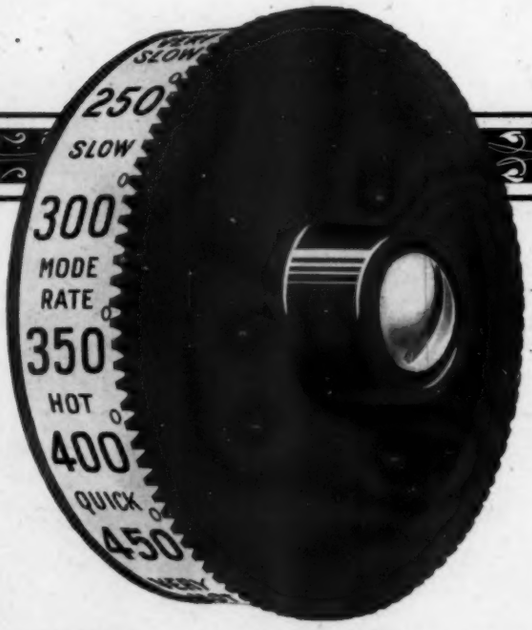


A KOMPAK Automatic Heating System insures clean, economical, noiseless operation, while the KOMPAK Automatic Water Heater insures clean, economical, hot water service for years to come.

The basement becomes a thing of beauty where KOMPAK is used

THE KOMPAK CO.

NEW BRUNSWICK, N. J.



"Who Despises Fame Will Soon Renounce the Virtues that Deserve It."—MALLET

The following makes of gas ranges can *truthfully* be called *famous* because they have been made so by human skill developed through long experience; by modern manufacturing equipment; by the application of art and science; by consistent, honest advertising supported by forceful salesmanship; by national distribution and by world-wide owner-satisfaction, plus—

Red Wheel **LORAIN** *—First and Foremost of All Oven Heat Regulators*

CLARK JEWEL **DIRECT ACTION**
QUICK MEAL **NEW PROCESS**
RELIABLE **DANGLER**

AMERICAN STOVE COMPANY
801 Chouteau Avenue " " *St. Louis, Mo.*
LARGEST MAKERS OF GAS RANGES IN THE WORLD

LORAIN RED WHEEL

"Grateful for Ko-Ray"

says "A-BIT-OF-SWEDEN"

"WE are delighted with the Ko-Ray," says Mrs. Vera Nordstrand, owner of "A-Bit-of-Sweden," 1011 Rush Street, Chicago. "It retains the flavor of the food it cooks, saves time and labor—and I believe it will effect a reduction in our gas bills.

"We find it wonderful for roasting beef, ham, chicken and ducks. Three dozen chickens and one and one-half dozen ducks are often prepared in it on a Sunday.

"In fact, it is for the Ko-Ray's help with Sunday business that we are mainly grateful. It was formerly such a problem to keep food hot for a long period of time. Now, with the Ko-Ray, we can prepare the food in so much less time that no one can say, 'this was roasted four hours ago.' On the contrary, the food is fresh every minute—and there is much less waste than formerly.

"Chicken cooked in the Ko-Ray is much more tender, I believe, than when cooked in any other way. We find it also especially good for hams, and it prevents stews from becoming 'raggedy-looking.'

"It doesn't have to be watched—it is automatic, and yet it allows for individuality in cooking."

Ko-Ray

HOTEL AND RESTAURANT RANGE

—the hit of the show

Ask the man who tasted Ko-Ray-cooked food

Ko-Ray "Jumbo"

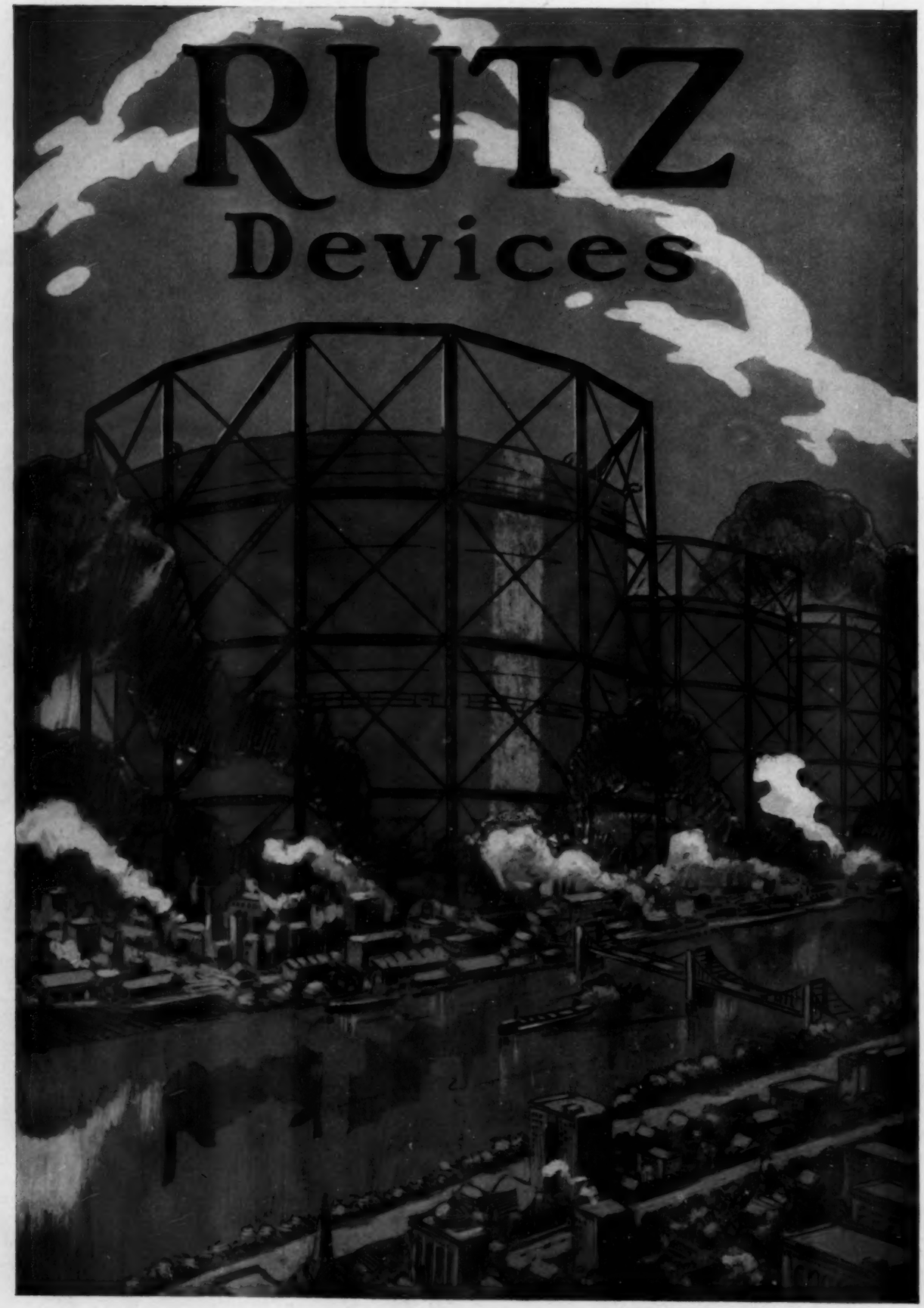
A NEW PRINCIPLE IN COOKING—The Ko-Ray cooks by saturated vapor, and by radiant heat that penetrates the food and seals in the flavor. It boils, bakes, browns, or roasts. It saves on shrinkage. It cuts cooking time. It saves greatly in labor and fuel. Its quick operation eliminates excess advance preparation of food. It is "self-basting." Unusual quality, tenderness and flavor result. There are no odors, no vapors, no smoke, no excessive heat. The Ko-Ray is automatic in operation—yet responds to the chef's skill.

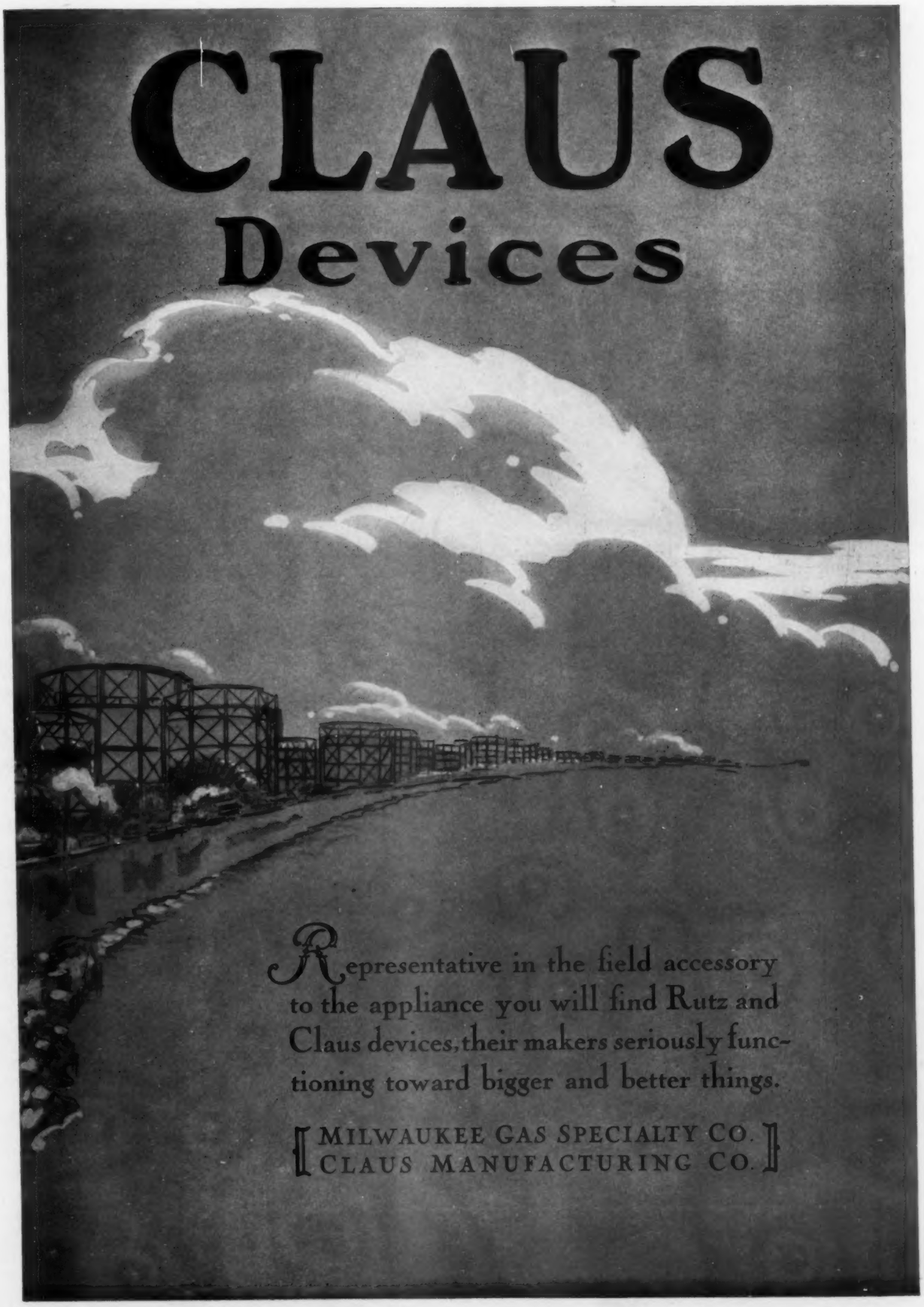
Write for full information and list of grateful users

Ko-Ray Corporation

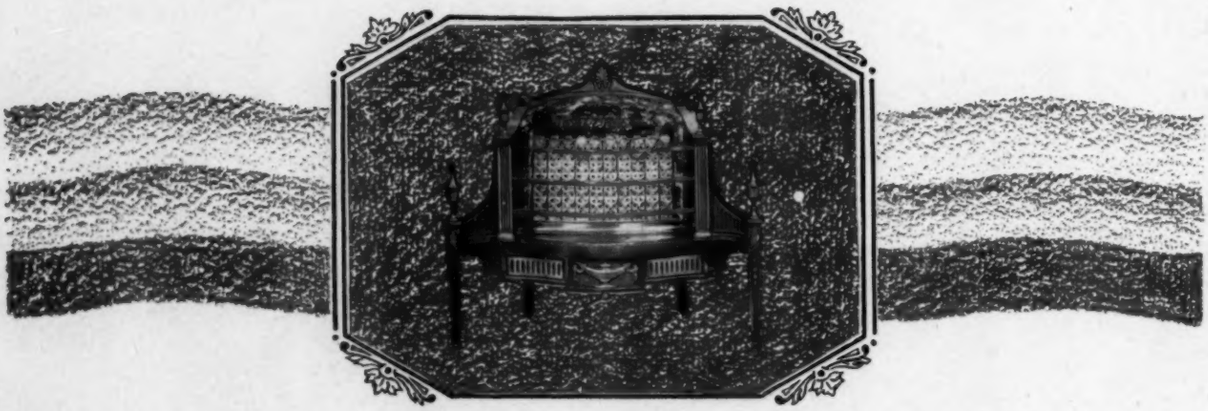
110 South Dearborn Street :: Chicago

"The Greatest Forward Step in Cooking in the History of Man!"


RUTZ
Devices


CLAUS
Devices
Representative in the field accessory to the appliance you will find Rutz and Claus devices, their makers seriously functioning toward bigger and better things.
MILWAUKEE GAS SPECIALTY CO.
CLAUS MANUFACTURING CO.

Increase your load through Humphrey Radiantfires



Increased—150,300 cubic feet of Gas Consumed!

How much more gas will be used if Humphrey's Radiantfires are installed? Hasn't that come to mind?

A Gas Company in a Michigan city selected 18 average homes where Humphrey's Radiantfires were installed. After a year they referred to the meter readings—150,300 cu. ft. increased gas consumption was noted—an increase of 31.3% over what had been used for the same period the year previous—or an average of 8,350 cu. ft. per home!

In Southern New York a Company reports an average increase of 10,000 to 15,000 cu. ft. per home after Humphrey's Radiantfire was used.

Are you interested in increasing your gas load through such a profitable medium as Humphrey's Radiantfire? It is nationally advertised and will sell readily. For full information write

IF IT'S HEAT YOU WANT—
The HUMPHREY
Radiantfire
The Odorless Gas Heater

GENERAL GAS LIGHT COMPANY
Kalamazoo, Michigan
New York: 44 W. Broadway San Francisco: 135 Bluxome St.

IF IT ISN'T A HUMPHREY—IT ISN'T A RADIANTFIRE

LET us help you! You cannot sell volume of automatic storage water heaters using hackneyed phrases of appeal. Threadbare, trite phrases do not stir the emotions to buy.

Easy sales—faster turnover —bigger profits—there is the goal of every merchant

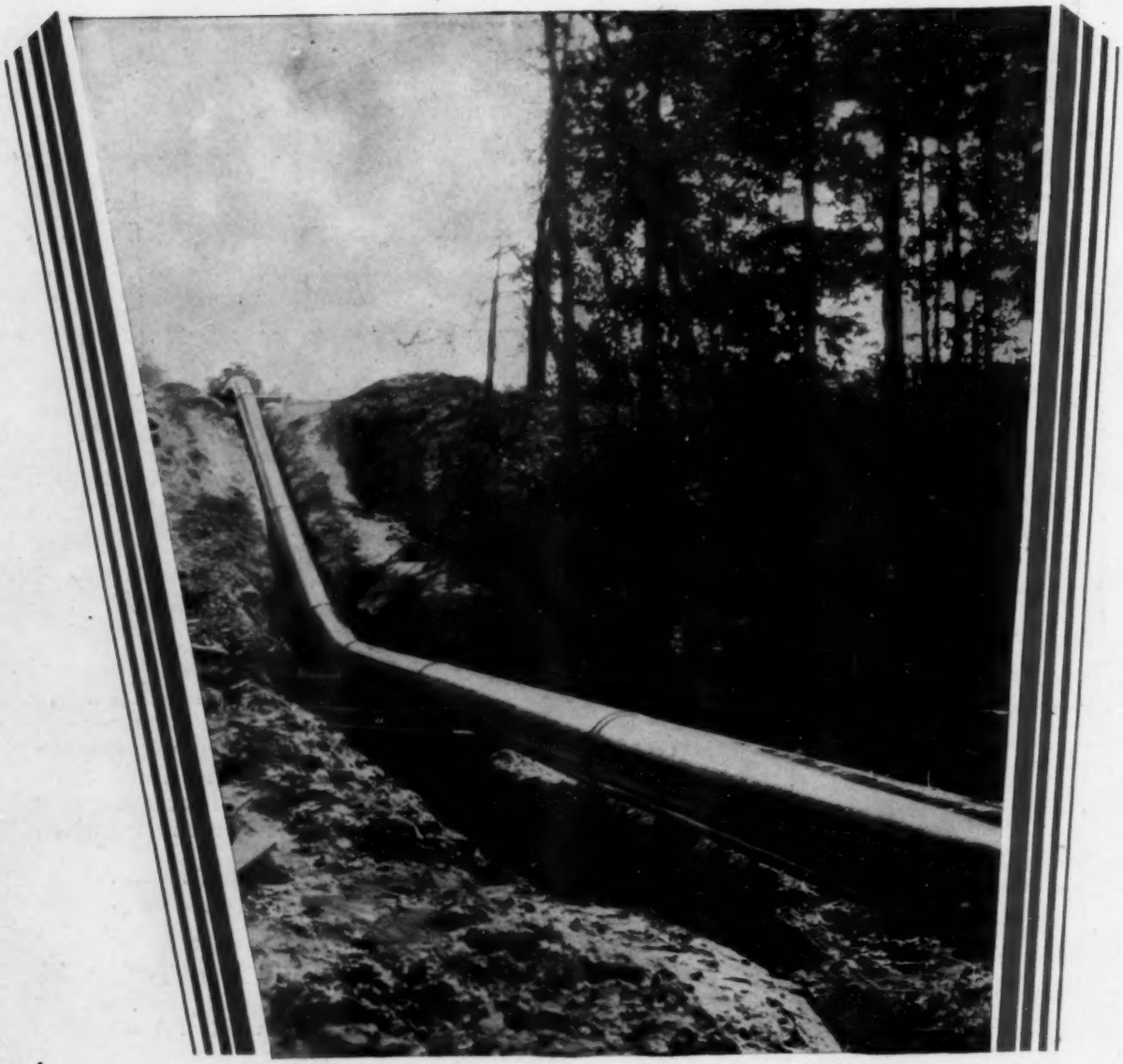
Let us help you! There is a forceful, vigorous, convincing advertising campaign behind Rex Automatic Storage Water Heaters. Every month we offer to gas companies selling Rex Automatic Storage Water Heaters a mailing piece, that carries with it a refreshing appeal. Always new, always different, always giving a reason why.

And, by the way, the "quality merchandise" which gas companies like to sell is represented in Rex Automatic Storage Water Heaters.

If you are not now handling Rex Water Heaters, write at once for prices and complete selling plan

THE CLEVELAND HEATER CO.

1900 West 112th Street Cleveland, Ohio

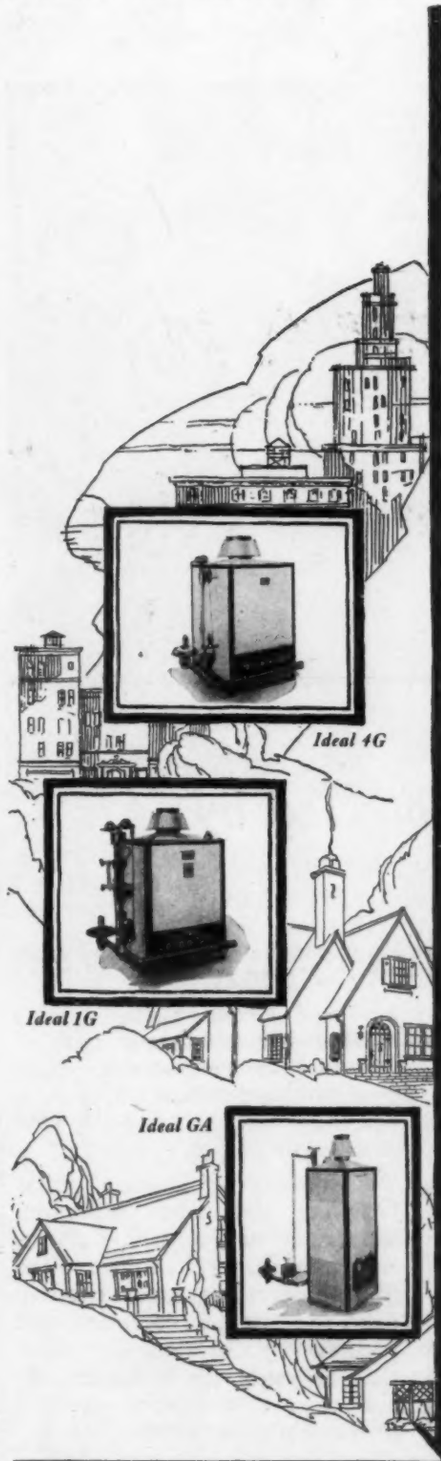


Somebody Said It Wouldn't Weld

This picture shows part of a 20 inch line, 160 Miles Long, all *SmithWelded* Gas Line Pipe, all joints welded.

A. O. SMITH CORPORATION
Oil & Gas Field Products Division
General Offices: Milwaukee, Wisconsin
District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles

SMITH*WELDED*
GAS LINE PIPE



AN IDEAL GAS BOILER *for* EVERY *heating need!*

For cottages or bungalows—with or without basements—an Ideal Arcola Gas Heater!

For small or medium-sized homes —Ideal 1G Gas Boiler!

For larger homes and buildings— Ideal 4G Gas Boiler!

For office buildings, big apartment houses, hotels — Ideal 4G Gas Boilers in multiple units!

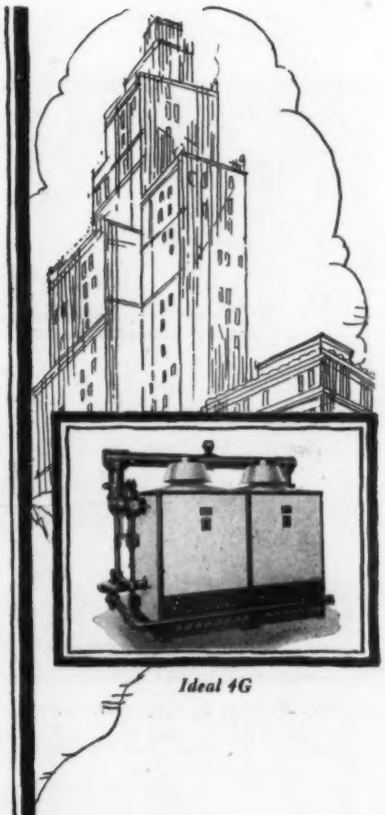
All these boilers are useful for large-volume hot-water supply and industrial applications.

THIS whole family of perfectly-designed gas boilers offers you *exactly* the right heating plant for *every* job on which you want to figure.

Designed and manufactured by the American Radiator Company, it is the latest triumph of their boiler engineers.

Ideal Gas Boilers are made available to you without delay by strategically-located distribution centers.

We have prepared for you a plan book covering every detail of selling plans that actually *work*. Won't you send for this complete and practical information?



IDEAL GAS BOILERS

Product of AMERICAN RADIATOR COMPANY *Gas Utilization Dept.*

Write to AMERICAN GAS PRODUCTS CORPORATION, *Distributors*

376 Lafayette Street, New York City

SERVICE DATA FOR PROTECTIVE PAINT USERS - - - - - CASE No. 6

Central Railroad Bridge, Newark Bay, N. J.

A costly improvement protected by Dixon's **PAINT**

One of the outstanding bridges from an engineering viewpoint erected in recent years is the Central Railroad of New Jersey's 4-track span across the Newark Bay. Working against formidable obstacles, this remarkable bridge, a structure 7,411 feet long and costing, with its necessary approaches, about $15,000,000, was opened to traffic in November, 1926.

Approximately 30,000 tons of steel are used in this bridge and its many years of usefulness are guaranteed by the fact that 12,800 gallons of Dixon's Natural and Dark Red Silica-Graphite Paint were used to protect it.

The Central Railroad of New Jersey's selection of Dixon's Silica-Graphite Paint was the result of many years of experience with this product.

This company has used Dixon's under a wide variety of conditions and knows that in spite of extremes in temperature, vibration, smoke, moisture and dryness Dixon's consistently has delivered more years of life.

The record of Dixon's Silica-Graphite Paint has influenced thousands of industrial plants, railroads, chemical works and the like to use this same effective paint to resist rust, corrosion, and process deterioration for more than 65 years. It is equally efficient as a protector of wooden, iron and steel structures.

Yes; Dixon's comes in several serviceable colors

Many people think of Dixon's Silica-Graphite Paint as unattractive. Actually it gives a fine durable semi-gloss finish, and it may be had in three tones of gray, dark red, green and black. There is also Dixon's Aluminum Graphite Paint for a silver-gray heat-reflecting finish.

Get the full story of Dixon's Silica-Graphite Paint by sending for Booklet No. B-231 today!

JOSEPH DIXON CRUCIBLE COMPANY
Jersey City, New Jersey
Established 1827

D X N
TRADE MARK

DIXON'S SILICA GRAPHITE PAINT

Adequate Protection at Minimum Ultimate Cost

GAS COMPANIES and STOVE DEALERS

Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

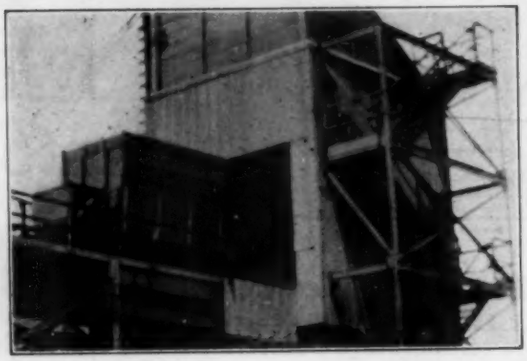
***Left**—Showing one of a battery of twenty-four Mitchell Electric Vibrating Screens suspended from structural iron work, under coke storage bins, delivering direct to a truck.*

HUNT

Gas Plant Equipment

Industrial Railways, Switches, Motor Operated and Push Cars, Automatic Railways, Conveyors, Mitchell Electric Vibrating Screen, Skip Hoists, Bin and Hopper Gates, Weigh Larries, "Stevedore" Manila Transmission and Hoisting Rope and Drilling Cable, Hunt Rope Couplings, Coke Reclamation Plants, Hoisting Equipment, Also Coal Crackers.

***Right**—Hunt Automatic Loading, Weighing, Traveling and Dumping Car. Capacity 130 tons Coal, or 80 tons (32 lb.) coke, per hour at average travel of 400 feet—at The Rockaway, N. Y., Plant of the Queensboro Gas & Electric Co.*

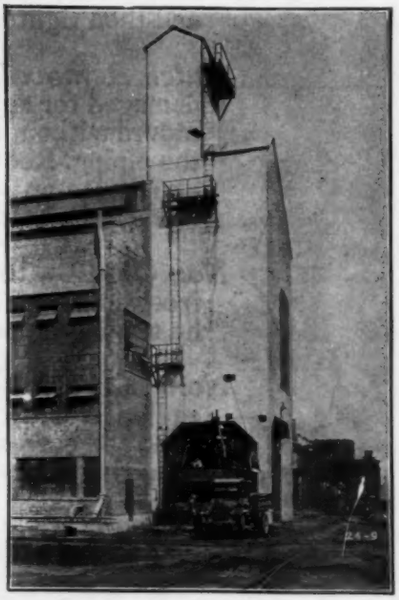


***Below**—This all-concrete structure enclosing skip hoist and including cut-off gates, swiveling chutes (adaptable to any position for loading both railroad cars and wagons) and weigh larry; — this latter lined with maplewood to protect metal from abrasive action of coke—was designed and built by the C. W. Hunt Co., Inc.*

In the eternal quest for greater and yet greater economies in the gas plant, the opportunity offered by Hunt Gas Plant Equipment for effecting marked economies in the handling and re-handling of coal, coke and ashes stands out in bold relief.

In testimony of the ruggedness of Hunt Equipment, we can cite installations where Hunt apparatus has been in active service for from 18 to 30 years, with only minor repairs.

Hunt Engineers with over 56 years' experience will gladly assist you in planning a coal, coke and ash handling system to meet every requirement for labor, time and money saving. Write today.



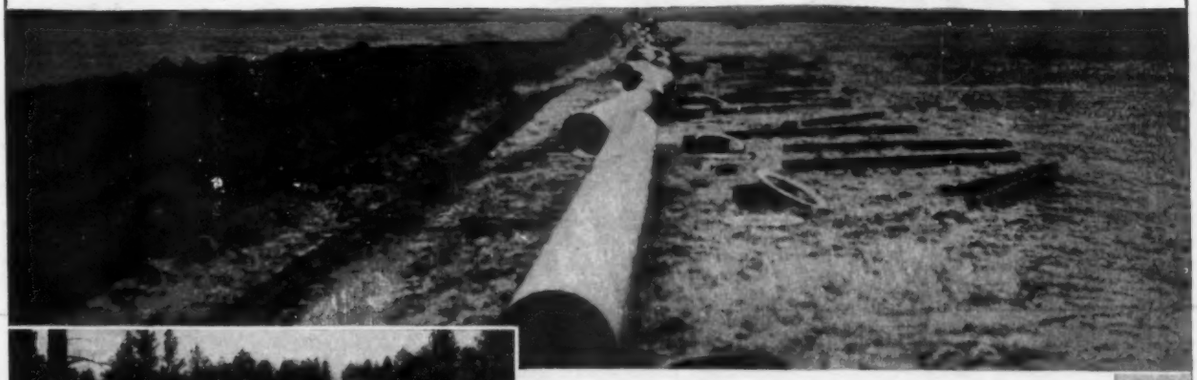
C. W. HUNT COMPANY, Inc.

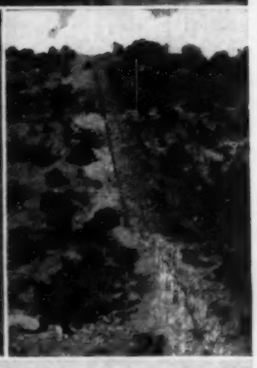
West New Brighton
PHILLIPS LANG & CO., Inc.
431 S. Dearborn St., Chicago, Ill.

ENGINEERING EQUIPMENT CO., Ltd.
358 Beaver Hall Square, Montreal.

Staten Island, New York
ERNEST F. LEARNED
141 Milk St., Boston 9, Mass.

Amarillo-Denver Gas Line





An engineering conquest with "NATIONAL" PIPE

THROUGH the application of modern engineering principles and the attainment of a high degree of manufacturing efficiency, the transportation of America's natural resources is constantly being extended. Hundreds of great pipe lines are now carrying oil and gas to practically every section of the country. Across plains, up and down mountains and steep hillsides, through deep canyons and across streams, pipe lines are being laid with much the same regularity and plan as our great railway systems. Communities heretofore unserved are now economically and efficiently supplied with these useful and convenient products.

But such projects carry a heavy responsibility. Investments running into millions of dollars must be safeguarded with materials that give every promise of long and faithful service—there can be no compromise with quality.

Here, another engineering conquest has been completed, another link in the network of great pipe lines which spread across the continent. The main line of this latest project contains over 300 miles of 20 and 22-inch "NATIONAL" Pipe—The Recognized Standard for Gas Line Service.

NATIONAL TUBE COMPANY
Pittsburgh, Pennsylvania

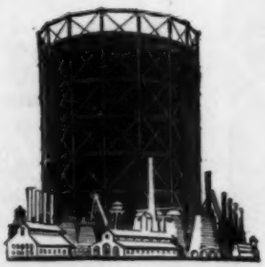
The ONE fuel that can keep step with every change in your plant

Nearly all plants, at times, have these conditions to meet:

A change in production methods; the introduction of a new product; the need for greater production facilities.

Not only are these problems most easily met when the fuel employed is gas, but, with gas, they can invariably be met in the way that insures utmost operating efficiency.

Rearranging or extending heating facilities, when gas is employed, often involves nothing more than the rearranging or extending of gas piping.



You can do it better with GAS

Gas service can be readily taken to parts of the plant where it would be difficult, if not impossible, to apply other forms of heat.

The availability of gas to all parts of the plant is but one of many advantages inherent in this superior fuel. Your local gas company will be glad to tell you of all these advantages and what they will mean to your plant. Telephone or write them today.

For free copy of book, "Industrial Gas Heat", address

American Gas Association
420 Lexington Avenue, New York City

Two of the Latest

The MEMPHIS Gas Line

The ATLANTIC Oil Line

Among the Greatest Gas and Oil Lines

For approximately 160 of its 220 mile length the great 18" Memphis Natural Gas Line will run through the low flood regions of the Mississippi River. This section of the line requires the utmost in protection and the Memphis Natural Gas Company has, consequently, selected BITUMASTIC ENAMEL for this all-important work. Transmission and the distribution of gas from the Monroe fields in Louisiana to Memphis and the intervening region is thus assured for many years to come. For nearly half a century, in fact, no pipe nor any other metal surface to which BITUMASTIC ENAMEL has been properly applied has ever suffered from the inroads of corrosion.

Another notable BITUMASTIC job is now under way in connection with the Atlantic Line—one of the largest oil lines in the world. BITUMASTIC ENAMEL is being applied to all 500 miles of this line—a 10" pipe laid by the Atlantic Pipe Line Company (a subsidiary of the Atlantic Refining Company) between Midland, Texas, and the Company's refinery in Port Arthur. These jobs are, of course, but two of many—the latest undertaken for the greatest pipe line projects in the world and for an even larger number of the distribution systems where a smaller size of pipe is laid for a much shorter distance. Engineers in every field have found no coating to compare with BITUMASTIC for the permanent protection of steel pipe.

Why should any oil or gas line company or a distributor of manufactured gas suffer losses from corrosion or experiment with untried coatings when this—

"Proven Protection Against Soil Corrosion"

—is available to all? Write for our book—"The Protection of Pipe Lines." Also Bulletin 205—"Directions for Application."

BITUMASTIC
REG. U.S. PAT. OFF.

ENAMEL

Wailes Dove-Hermiston Corporation

17 Battery Place, New York

Philadelphia Cleveland Chicago Houston Tulsa San Francisco

Tycos Gas Leak Indicators

Are a quick and efficient means of locating gas leaks. As soon as the gauges show a leak somewhere along the line, it may be traced by driving small holes along the main and using one of these Indicators. The hand will indicate the place of greatest flow and the leak may be then fixed.
Instruments indicate the presence of either heavy or light gas.

TYCOS Gas Leak Indicator No. 3405

Comes completely equipped in sole leather carrying case with strap, weight about 1¾ pounds.

TYCOS Gas Leak Indicator (Vertical form)

Improved type, vertical form. In sole leather carrying case with strap, weight about 1¾ pounds.

Write for additional information and TYCOS Gas Catalog.

Taylor Instrument Companies

Rochester, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

It's Worth While to look at the Last Cost

Unless we could demonstrate that the Haiss Belt Conveyor would do enough more work with sufficiently lower upkeep to warrant its preference over cheap-to-buy machines we would not be making the sales we do. A Haiss Belt Conveyor is the least expensive kind to own because it is GOOD.

With ball bearing belt rollers, strong rigid frame, pulley adjustments to keep the belt running true (as well as taut), the difference in design is evident.

Let us send you a Catalog and let a Haiss price quotation show you how little (if any) more it costs to buy quality in a Belt Conveyor.

George HAISS Manufacturing Co., Inc.,
Park Ave. & 141st Street
NEW YORK, N. Y.

SUPERIOR METERS

All that the name implies

The present is an age of consolidations and mergers, the advisability of which has been economically demonstrated and accepted. But monopolies are universally condemned and the old saying that "competition is the life of trade" is as true today as the day it was coined. To avoid any misunderstanding as to our position in the Gas Meter Industry, we desire to make the following statement:

We have not merged with anyone. Year after year we have forged ahead building up a reputation for integrity, dependability and service. Since the founding of this company, our relations with our competitors have always been friendly. But we have preferred to function as an independent organization and shall continue to do so, preserving our own identity and adhering to the sound principles upon which the business was established.

What these principles are, our Customers well know. We manufacture meters, built in accordance with recognized standard specifications and at a price consistent with quality. To our customers the name SUPERIOR is a *guarantee*. We are justly proud of our reputation and we possess an identity that will endure beyond the mere business of making a profit.

SUPERIOR METER COMPANY

167-41st Street Brooklyn, N. Y.

"CRANKS" and "NUTS" and "HOT AIR ARTISTS"

Is What They Called Us a While Ago
When We Claimed Perfection in Freight Elevators

ALL BUT THE BIG SMART ONES.

The Big Smart Ones like **Standard Oil, American Tobacco, United Gas Improvement, Public Service of New Jersey, Manhattan Rubber, Brooklyn Union Gas Co., John Morrell & Co., Christie Brown Co.,** and thousands of others

CAUGHT ON (as the boys say) AND GOT RIDGWAY ELEVATORS.

AND GROWN VERY RICH

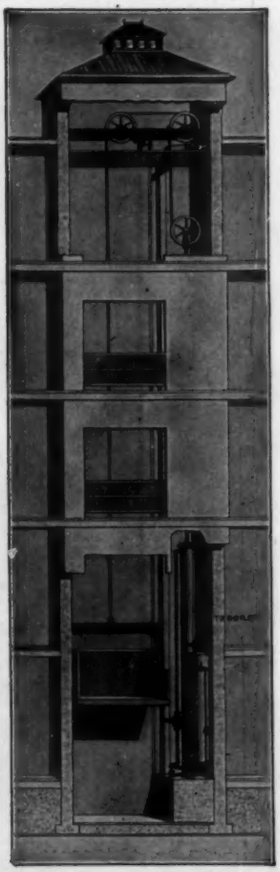
The years have demonstrated the wonderful excellence of the Ridgway Elevators.

And Now
The Whole Wide World
Is Handing Your Uncle Billy
Beautiful Boquets
With a Bright Ribbon and Golden Cane.

"HOOK 'ER TO THE BILER"

Direct Acting

Double Geared



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Over 3,000 in daily use. COATESVILLE, PA.

MORE PROTECTION FOR LESS MONEY

when you use

SEMET-SOLVAY PROTECTIVE PAINTS

for Iron and Steel

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ACID RESISTING PAINT for steel gas mains.
No. 10 CRYSOLITE for Corrugated Iron, Tanks and Outside Exposures.
GRAPHITE BRIDGE PAINT unequalled for long durability.
CONCRETE COATING for waterproofing concrete.

Write for Literature, Samples, Prices

SEMET-SOLVAY COMPANY

61 Broadway ***By-Product Coke for Water Gas Manufacture*** **New York City**

Will You Dig the efficient Way Next Year?

Digging trench by hand is a costly and inefficient method.

When you do your trenching with The Cleveland Baby Digger you do the job efficiently and economically, for it eliminates hand labor on more jobs and in more places.

This little machine has demonstrated that a trencher can be fast, rugged and powerful and yet so compact and light that it will operate with highest efficiency in the very limited working areas as well as in the more open spaces. It is delivering maximum trench footage in the toughest and hardest soils.

The Baby Digger can be moved from location to location quickly and easily either by truck or its own trailer. Five minutes loads or unloads it. This feature of extreme mobility means that you have this efficient digging quickly available, no matter where your job or what its size.

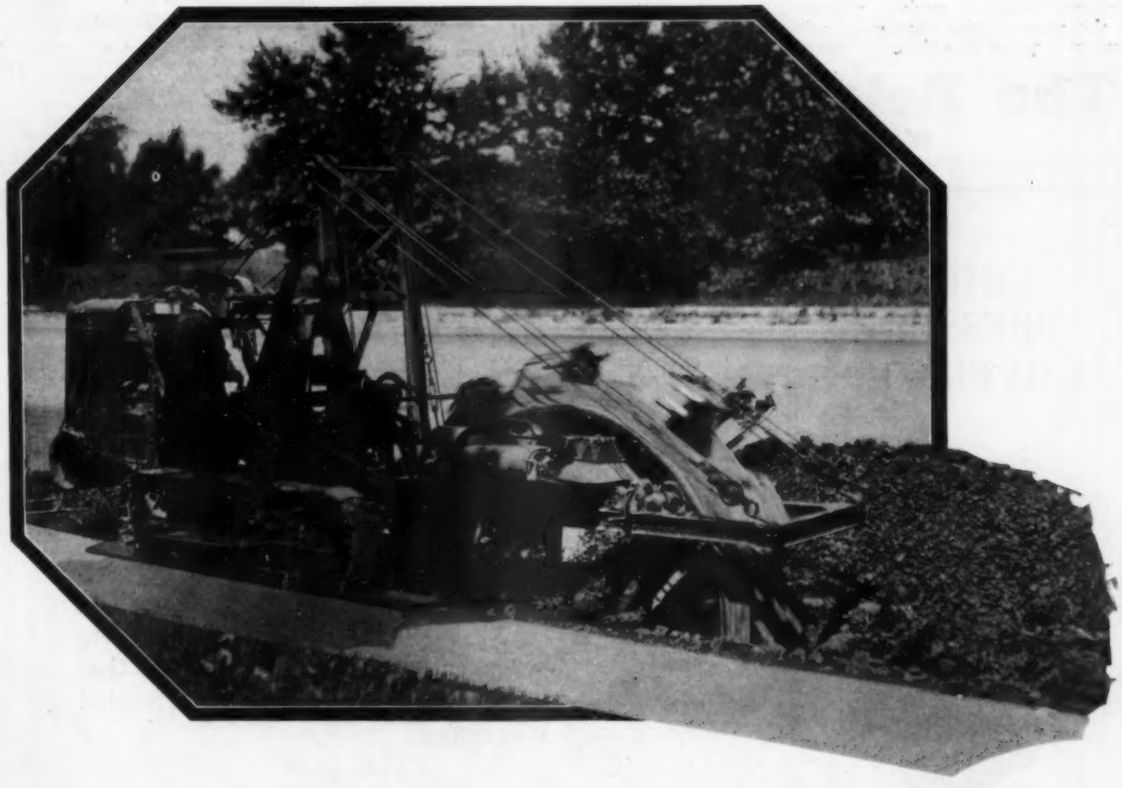
Within its digging range 5' 6" deep and up to 23½" wide you'll find the Baby Digger a most usable, practical, economical trencher. The most efficient way to dig Gas trench next year and every year.

Write, phone, or wire for full information and be set for real savings in your trench construction work in 1929.

The Cleveland Trencher Company

"Pioneers of the Small Trencher"

20100 St. Clair Ave **Cleveland, Ohio.**



THE BABY DIGGER

Genuine Bristol's Charts are *Accurate*

—and the high standard performance of Bristol's Instruments can be guaranteed . . . only when they are used.

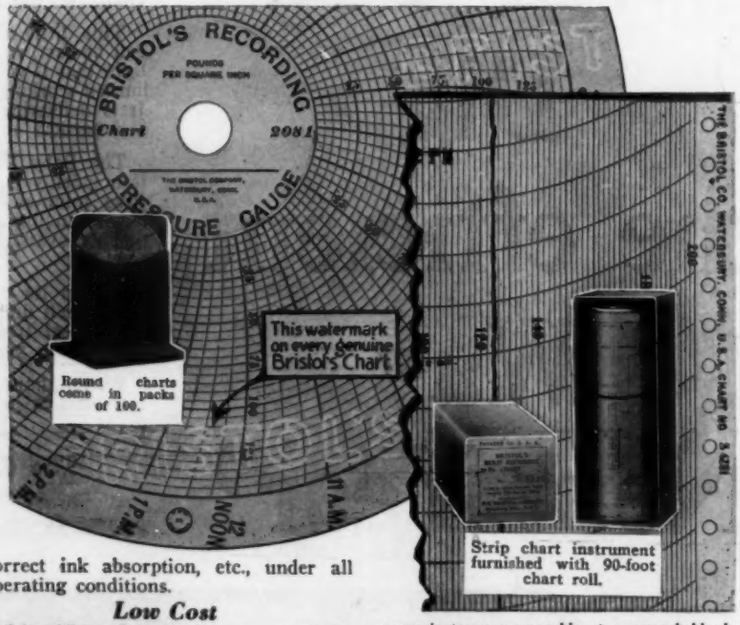
To identify them, every Bristol's *Round Chart* is printed on paper having water mark reading "BRISTOL'S;" and the name of The Bristol Company printed in the center: *Strip Charts* having The Bristol Company; chart number; etc., printed on the side.

Use Only Charts Specified

It is also well to bear in mind the fact that every Bristol's Recording Instrument is calibrated to be used with particular chart specified as most suitable for the application in hand. This makes it necessary that charts used for such application be identical without the slightest variation in order to assure continuous accuracy.

To Insure Accuracy

Close attention is given to the finest details in all matters pertaining to the design and printing of Bristol's charts. The printing is done from extremely accurate engravings, and under constantly uniform humidity conditions in our own plant at Waterbury, Connecticut. Even the paper from which various types of charts are made is specially processed for the purpose—the quality of paper being such as to provide clear records, correct ink absorption, etc., under all operating conditions.


BRISTOL'S RECORDING
Chart
2081
PRESSURE GAUGE
Round charts come in packs of 100.
This watermark on every genuine Bristol's Chart
Strip chart instrument furnished with 90-foot chart roll.

Low Cost

And in addition, Bristol's charts are, in almost every instance, procurable at a remarkably low cost. In fact, it is generally conceded that chart replacement costs with Bristol's Instruments are so small as to be really inconsiderable.

All of which should lead those responsible for maintenance of accurate instrument service to safeguard their own interests by using only the genuine Bristol's charts.

The Bristol Company

Waterbury, Connecticut

HIGH PRESSURE GOVERNORS

Write for Our Catalog

FULTON DUPLEX SENSITIVE GAS GOVERNOR

THIS type of GOVERNOR is especially adapted to meet all the requirements where the HIGH PRESSURE system is used. It is applicable for MANUFACTURED or NATURAL GAS.

Equipped with TWO DIAPHRAGMS, thus giving it a vastly increased sensitiveness and power over that possessed by the same type of governor constructed with but a single diaphragm.

The CHAPLIN-FULTON MFG. CO.

28-40 Penn Ave. Pittsburgh, Pa.

Six Major Improvements

1 Sprague Special Diaphragms
Acid resisting, semi-chrome retanned leather

2 Enclosed Top Bracket
Protects and lubricates the worm and gear

3 Improved Valve Cover
Eliminates possible breakage in transit

4 Raised Bosses on Flanges
Eliminate seepage in wet gases

5 Bronze Bushed Links
Reduce wear and lost motion

6 Improved Adjusting Tools
Reduce shop costs

All designed to better the one and a half million Sprague Meters in Service

THE SPRAGUE METER CO.
BRIDGEPORT, CONN.

To The Industrial Sales Manager:-

YOUR consumers rightfully expect you and your organization to be able to inform them of the developments in the fuel and furnace field that would be to their advantage to adopt.

To maintain their confidence and good will you must be completely informed.

Are you acquainted with the recent remarkable developments of this organization?

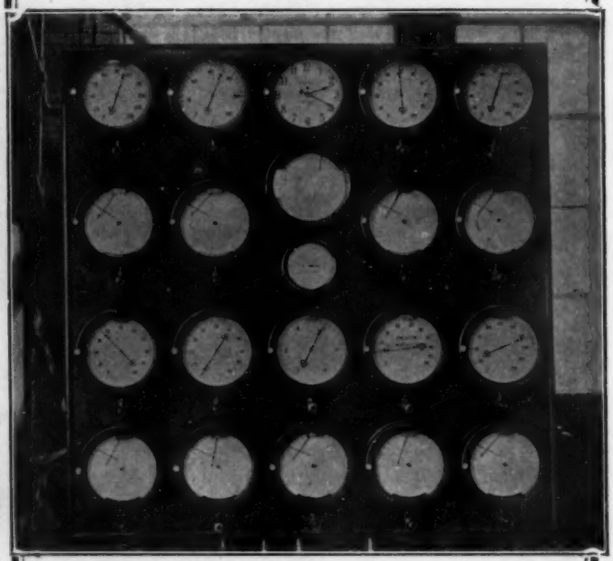
If not, you owe it to your consumers and your company to investigate.

Write, phone or telegraph.

The C.M. KEMP Mfg. Co.

Baltimore, Md.

GAUGE BOARDS



American Gas Maker's Gauges, Recording Gauges, Clock and Recording Thermometers in a large New York Gas Plant. Centralized control over critical pressures and temperatures makes for plant efficiency.

Send for our Gas Makers text book "Manufactured Gas" if you haven't received your copy.

Write for the following Catalogs:

Gas Maker's Gauge Catalog P-7
Recording Gauge Catalog E-7
Thermometer Catalog F-7
Recording Thermometer Catalog H-7
Tachometer Catalog J-7
Temperature Controller Catalog R-7

AMERICAN INSTRUMENTS
SINCE 1851

CONSOLIDATED ASHCROFT HANCOCK CO. INC.
AMERICAN SCHAEFFER & BUDENBERG DIVISION
338 Berry Street Brooklyn, N.Y.

This

"MAGIC BEAD"

Seals Mono-Cast *Joints Uniformly!*

It's the bead that decides the future of the joints in your pipe line—because it's the bead that centers the spigot in the bell and anchors it there to stay!

That centering is important, because without it your lead and packing will not be uniformly distributed in the bell.

That anchoring is important because without it your joint might pull out.

In Mono-Cast pipe, the bead is CAST ON the spigot end —increasing the strength of the spigot and insuring it against breakage in transportation or handling in the field. That's why Mono-Cast joints are tighter, more uniform, and more efficient all down the line... one reason why Mono-Cast Pipe is *cheaper in service years!*

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA
DISTRICT OFFICES IN PRINCIPAL CITIES

R&E

REFRACTORY CEMENTS

are solving many maintenance problems of refractories in gas plant equipment. We cite for example three of our recent field reports.

Water Gas

In a 12' Water Gas Set the lining was laid up with R & E 3000 and a wash coating of the same applied to prevent penetration and clinker adherence. After 1500 hours constant severe operation the generator was shut down for inspection. The lining was in excellent condition and the generator was again put in service for another 1500 hours. At the end of 3000 hours, R & E 3000 had established a record for severe duty far beyond any previous experience with other cements. R & E 3000 had saved a big repair charge.

Gas Benches

Several months ago we patched a gas retort with R & E 3000, filling a hole 18" x 42". Several other cements had been tried on this repair job but all failed. Our patch with R & E 3000 is still there.

Coke Ovens

A large coke oven plant is using R & E 3000 to level the floors of the ovens when they become corrugated. Ask us how we did it. We'll gladly tell any coke oven superintendent.

R & E 3000 comes in plastic form ready for immediate use. It can safely be used for construction and patching work where temperatures do not exceed 3000° F. R & E 3000 is shipped in air-tight steel drums, 800 lbs., 500 lbs., and 100 lbs. Full directions on each drum.

Ask for booklet describing characteristics and uses of our special cements—wet or dry.

Refractory & Engineering Corp.

50 Church St. New York

Western Representatives—The Gehnrich Corporation.

327 So. La. Salle St., Chicago

Distributors with Stock at Convenient Points

Are these Unseen Talons Scratching the Heart out of your Air Compressors & Tools?

UNFILTERED air carries with it millions of unseen particles of diamond-sharp grit that constantly digs and scratches at the glass-smooth surfaces of reciprocating parts—100,000 or more cutting dust particles in every cubic inch of air—100,000 atoms that build up carbon deposits and tear down the metal walls of cylinders, pistons, bearings and valves.

Don't permit dust and sand to get in its destructive work on your compressors, engines, blowers, compressed-air tools, autos and trucks.

PROTECTOMOTOR

REG. U.S. PAT. OFF.
99 9/10 Per Cent EFFICIENT

AIR FILTERS

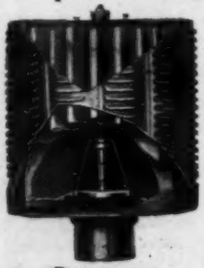
positively remove 99-9/10% of foreign matter from the air. It not only reduces wear on moving parts as much as 75 to 85%, but also reduces carbon deposits 60 to 70%. Consequently, machines are kept new and more efficient so they will do more work and can be operated from 3 to 5 times longer before overhauling is necessary—doing away with frequent shutdowns for repairs.

The remarkable thing about the Protectomotor is its simplicity. It requires no extra accessories, such as cleaning tanks, cleaning solution and spare parts. Due to the scientific arrangement of filtering felts, this small, compact filter will pass up to 250 cu. ft. of air with an average pressure drop of not over ½ in. of water.

PIPE LINE FILTER

Pipe lines equipped with the Model CP Protectomotor Filter will deliver clean, dry air for paint spraying, compressed-air tools, hoists, cleaning operations, agitating liquids, ice-making, chemical processes, etc.

It removes all water, oil, dust, rust, scale and other foreign matter from air passing through pipes and prevents wear and damage caused thereby.



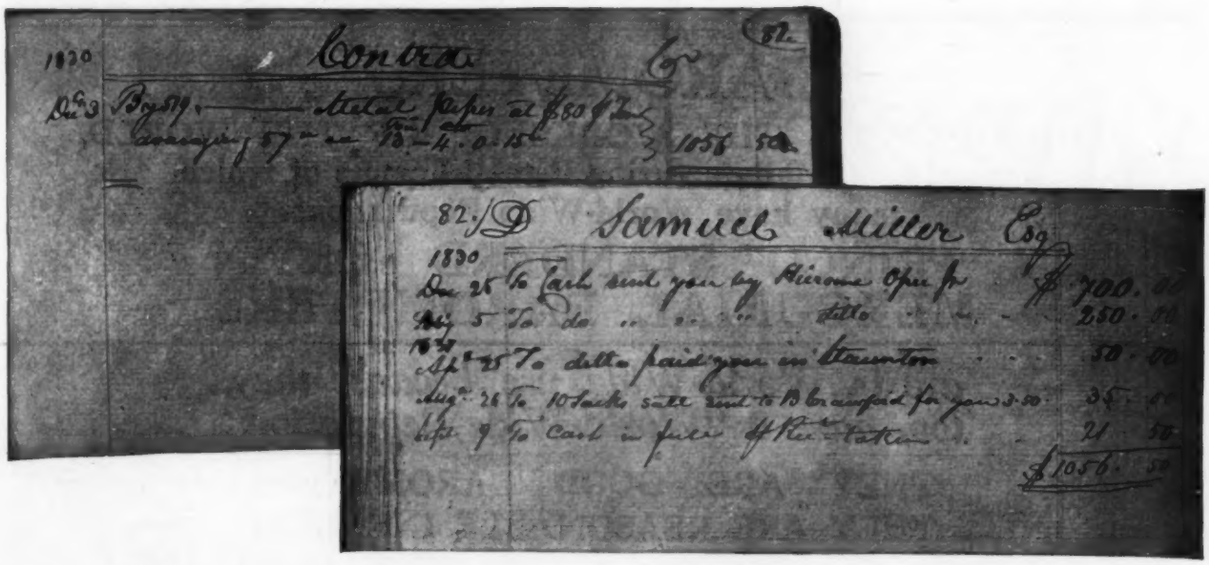
Protectomotor

Free Trial Offer

Let us send you a Protectomotor on 30 days free trial. If it does not do all we claim, return it and the trial won't cost you a cent. Write for booklet and full information.

STAYNEW FILTER CORP.

115 N. Water St., Rochester, N.Y.



An 1830 Purchase of CAST IRON PIPE *that is still in use today!*

A CENTURY. Or two centuries, or *more*, is nothing at all for cast iron pipe!

The pipe shown above was laid in Brookewood, Va. 98 years ago. It is as sound today as the day it was laid—good for at least another century. Further proof that, once in the ground, cast iron pipe can be forgotten. Its full life has never been measured.

For gas and water mains under busy streets, for road culverts and for hundreds of other uses, where permanent, uninterrupted service is vital, cast iron pipe is the undisputed choice of engineers.

There are many other facts about cast iron pipe that are important to every taxpayer, engineer and city official. Authoritative data on any subject pertaining to pipe use is available to any inquirer through The Cast Iron Pipe Research Association. Address: Thos. F. Wolfe, Engineer, Peoples Gas Building, Chicago, Ill.

CAST IRON PIPE

BAROMETERS

**PHILADELPHIA, THE WORKSHOP OF THE WORLD,
has 14,000 Manufacturing Establishments of which
many have World-Wide Reputations.**

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

**THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!**

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

DEHYDRATING EQUIPMENT FOR GAS PLANTS

GAS
AFTERCOOLING
DEHYDRATING
CONDENSING

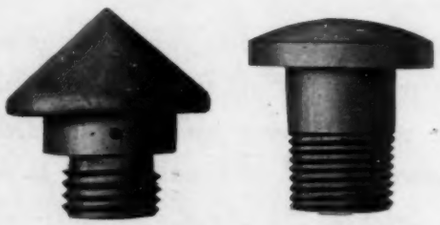
OIL
HEATING
COOLING
STRAINING

Andale Company

ANDALE
REG. U.S. PAT. OFF.

Sixteenth and Arch Streets
PHILADELPHIA

Gas Outlets



There are many forms of lava that may be used as a seat for combustion with manufactured or with natural gas.

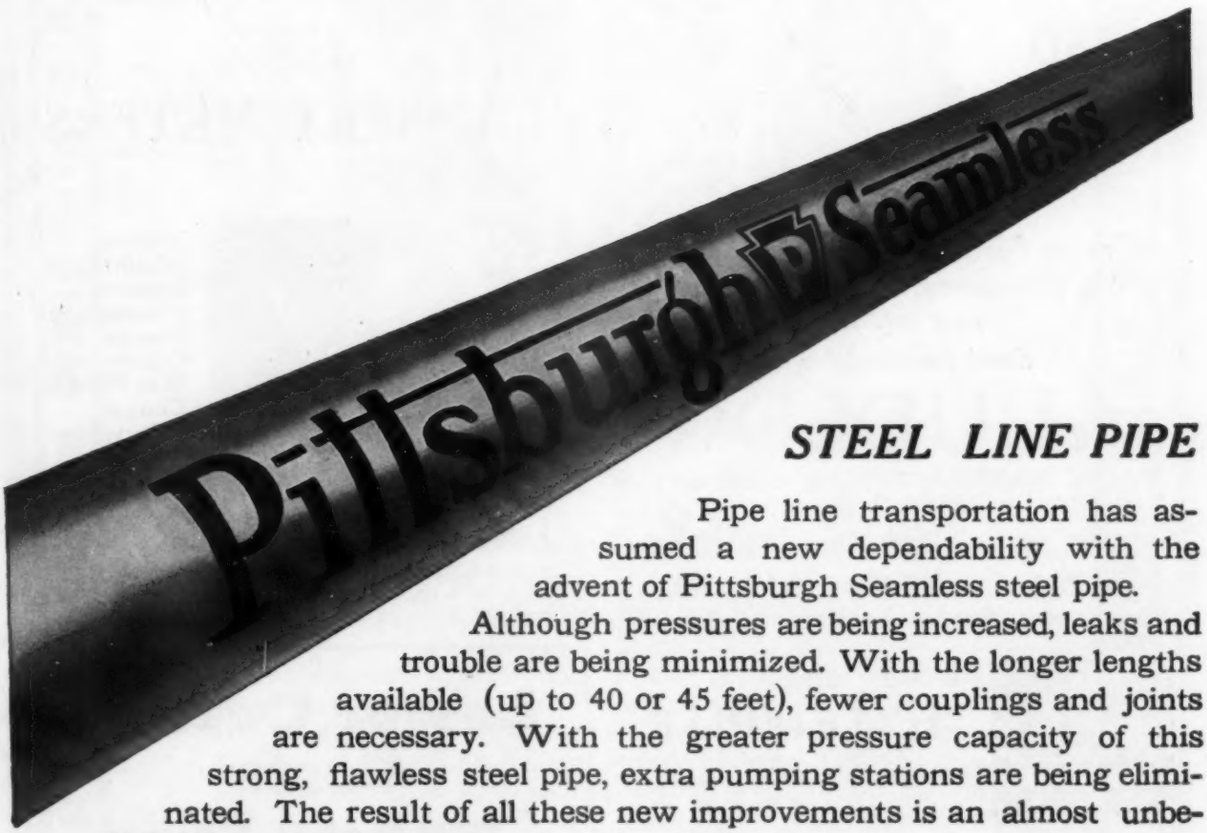
Varied in size, shape and design, lava parts are made to equip a diversified range of gas burning machinery.

Tested by manufacturers, lava has been adopted because of the properties of this material which insures its superiority as a gas outlet.

Write us for further information.

American Lava Corporation
29-59 William St. Chattanooga, Tenn.
Manufacturers of Lava Tips & Heat Resistant Insulators

THE NEW ERA IN PIPE LINE PRACTICE



STEEL LINE PIPE

Pipe line transportation has assumed a new dependability with the advent of Pittsburgh Seamless steel pipe.

Although pressures are being increased, leaks and trouble are being minimized. With the longer lengths available (up to 40 or 45 feet), fewer couplings and joints are necessary. With the greater pressure capacity of this strong, flawless steel pipe, extra pumping stations are being eliminated. The result of all these new improvements is an almost unbelievable economy.

Seamless is the modern standard for all important piping. It is made of stronger, more durable steel and eliminates the weaknesses of welded pipe seams

Pittsburgh Seamless ***Is Safe***

Pittsburgh Steel Products Co.

DIVISION OF

Pittsburgh Steel Co.

DETROIT · CHICAGO · NEW YORK PITTSBURGH · HOUSTON · TULSA

Pacific Coast Distributors—Buck & Stoddard, Los Angeles, Calif.

FLANGE END

VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

The LUDLOW

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TROY, N. Y.

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"The Universal High Temperature Cement"
are Synonymous

HYTEMPITE is the ideal high temperature cement for Gas Plants, because it has many uses. HYTEMPITE
—insures quick, economical repairs of Retorts, Jamb Joints Furnace Walls, Arches and Baffles.
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—stands up under severe weather conditions.
—makes thin, strong joint between tile or brick that stands up under extreme abrasive action of clinker tools.
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Keep a drum of HYTEMPITE in Retort House or Boiler Room for quick repairs

Quigley Furnace Specialties Co., Inc.
26 Cortlandt St. New York, N. Y.
Stock and Service in every Industrial Center.
"HYTEMPITE" is a Quigley Product.

Lower Cutting Costs
With this Torch

Type LPG

Uses City Gas, Natural Gas or By-Product Gas

A torch especially developed for use with City Gas, Natural Gas or By-Product Gas. Employs famous Milburn principle of supermixing which results in greater efficiency and economy. Get full details of this LPG Cutting Torch and complete Milburn line of cutting and welding apparatus.

Ask for Booklet 371-10 on Welding and Cutting Apparatus. Advise also if interested in Oil Pre-heaters, Paint Spray Equipment, Carbide Lights, Etc.

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World's first cast iron pipe still in service

Made "The McWane Way" 264 Years Ago!

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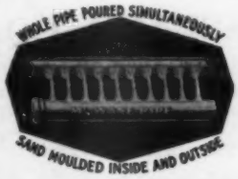

The Versailles pipe has now been in continuous use 264 years and still is in good condition. Think it over!

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CAST IRON PIPE

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PITTSBURGH

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FOR
THE GAS INDUSTRY

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Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

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The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

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of
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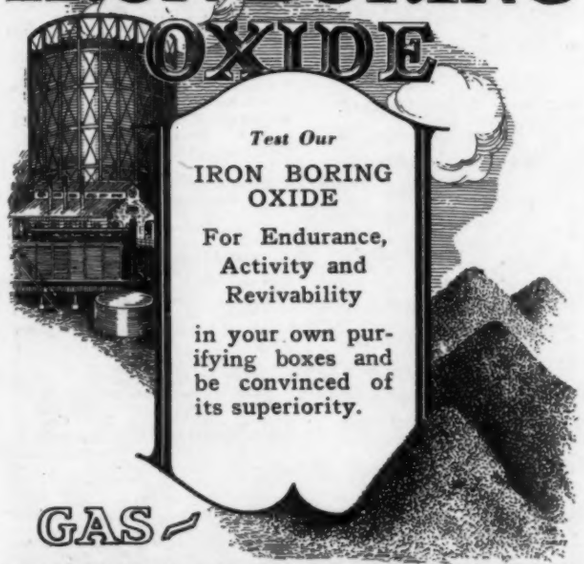
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SOAP TAPE
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PLUGS
JOINT RUNNERS
AIRLINE MASKS

Safety Gas Main Stopper Co.
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See page 133 for advertisements of these products

A. B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ACCUMULATORS—STEAM
The Gas Machinery Co.
Ruth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE EQUIPMENT
American Lava Corp.
Alexander Milburn Co.

ACCOUNTING MACHINES
Remington Rand, Inc.

AIR FILTERS
Staynew Filter Corp.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

BELTS
Conveyor and Elevator.
Robins Conveying Belt Co.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Jersey City Refractories Co., Inc.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
Carl Still, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Industrial Burner
Connersville Blower Co.
Revivifying
Connersville Blower Co.
Water Gas Set
Connersville Blower Co.

BLOWERS & BOOSTERS
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
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Carl Still, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

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Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

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Remington Rand, Inc.

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Boverie Elec. Corp.
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.

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Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
Improved Equipment Co.-Russell Eng. Corp.
The Jersey City Refractories Co., Inc.
United Engineers & Constructors, Inc.
Silica
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUCKETS—CLAMSHELL
Geo. Haiss Mfg. Co.

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United Engineers & Constructors, Inc.

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American Lava Corp.
The C. M. Kemp Mfg. Co.
Conversion
Cleveland Gas Burner & Appliance Co.
Conversion House Heating
Roberts Gas Burner Corp.
Fuel
Cleveland Gas Burner & Appliance Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

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C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock

CALORIMETERS
Co., Inc., American Schaeffer & Budenberg Corp. Div.
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
The Jersey City Refractories Co., Inc.
Quigley Furnace Spec. Co., Inc.
Acid-proof
Botfield Refractories Company.
Joseph Dixon Crucible Company.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
Joseph Dixon Crucible Company.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
Refractory
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory Engineering Corp.

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United Engineers & Constructors, Inc.

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Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
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CHUTES
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Riter-Conley Company.
Robins Conveying Belt Co.
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Westmoreland Coal Co.

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Carl Still, Inc.
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Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

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The Stacey Mfg. Co.

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Dry Quenching Equipment Corp.
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
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COAL TAR PRODUCTS
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Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.

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Angle Stove
Kitson Co.
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Kitson Co.
Hose
Kitson Co.
Meter
American Meter Co.
Kitson Co.
Superior Meter Co.
Service
American Meter Co.
Kitson Co.

COKE CRUSHERS
The Koppers Construction Co.
Robins Conveying Belt Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
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Semet-Solvay Engineering Corp.

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COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

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Cruse-Kemper Co.
Gas Engineering Co.
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Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.

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Robertshaw Thermostat Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

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C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
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(See Ammonia Concentrators.)
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Isbell-Porter Company.
The Stacey Mfg. Co.

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Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
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Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

COOLING COILS
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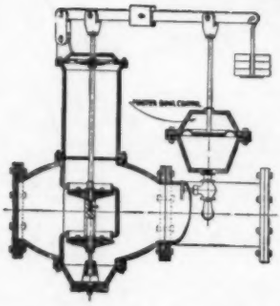
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

GROBLE
REGULATORS & GOVERNORS



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Coal Carbonization Plants, Benches, Repairs, Improvements, Extensions, Apparatus

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See page 157 for advertisements of these products

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Bartlett-Hayward Co.
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National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.

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CRUSHERS
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(Meter)
American Meter Co.

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The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
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Smoot Engineering Corp.
United Engineers & Constructors, Inc.
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United Engineers & Constructors, Inc.
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The Western Gas Construction Company.
Distribution
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(See Brick)
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Kitson Company.
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Plain End and Flanged
Cast Iron Pipe Research Association.

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General Gas Light Co.

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Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

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FLUE PIPE (Cast Iron Oval)
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Semet-Solvay Engineering Corp.

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Gas Fired
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Gas Soldering
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Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Pittsburgh Equitable Meter Co.

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Westmoreland Coal Co.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
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Gas Engineering Co.
Isbell-Porter Company.
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATES—WIND & BLAST
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The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
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The Bristol Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
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Taylor Instrument Companies.
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Mercury
Precision Thermometer & Instrument Company.
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D. McDonald & Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

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Alexander Milburn Co.

GLOVES
Rubber
Safety Gas Main Stopper Co.

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Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

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American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co.
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.

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Joseph Dixon Crucible Company.

GRAPHITE WATER PROOF GREASES
Joseph Dixon Crucible Company.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

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Feed Water
Andale Company.
House
American Gas Products Corp.
Cleveland Gas Burner & Appliance Co.
The Cleveland Heater Company.
Roberts Gas Burner Corp.
Room
American Gas Products Corp.
American Stove Company.
General Gas Light Co.
Homestead Heater Company.
Welsbach Company.
Water
The Cleveland Heater Company.
Humphrey Company.
Welsbach Company.
Hot Water
Electric Porcelain & Mfg. Co.
Kompak Company.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH HEAT RESISTING GRAPHITE GREASES
Joseph Dixon Crucible Company.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
Geo. Haiss Mfg. Co., Inc.
C. W. Hunt Co., Inc.
Robins Conveying Belt Co.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.
United Engineers & Constructors, Inc.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
Connelly Iron Sponge & Governor Co.

INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Recording
American Meter Co.

SERVICE TO THE INDUSTRY

REORGANIZATIONS and MERGERS

of the Public Utilities resulting in economies of operation have benefited the entire gas industry.

MANUFACTURERS OF GAS APPLIANCES now realize the necessity of a similar development in their industry if they are to be of real service to the Utilities in the matter of future sales and dealer cooperation.

INVESTIGATION OF THE INDUSTRY

has shown decided opportunities for economies in manufacturing and marketing. Many manufacturers can improve their situation by *Reorganization, Merger or Refinancing.*

PERMANENT CAPITAL—

is available through my association with reliable banking institutions in Chicago—New York—Philadelphia.

THIS SERVICE IS CONFIDENTIAL—

May we have the pleasure of serving you?

CHARLES W. WARDELL

2401 CHESTNUT STREET, PHILADELPHIA, PA.

Buyers' Reference Index

See page 133 for advertisements of these products

JOINTS (Pipe)
S. R. Dresser Mfg. Co.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.

JOINT RUNNERS
Safety Gas Main Stopper Co.

LAMPS
General Gas Light Co.
Welsbach Street Lighting Co.

LAMP POSTS
Welsbach Street Lighting Co.
General Gas Light Co.

LAVA BURNER GRIDS
American Lava Corp.

LAVA PILOT TIPS
American Lava Corp.

LOADERS—BUCKET, PORTABLE
Geo. Haiss Mfg. Co.

LOCKERS
Remington Rand Co.

LOOSE LEAF EQUIPMENT
Remington Rand Co.

LUX MATERIAL
Alpha-Lux Company.

LUX SPONGE
Alpha-Lux Company.

MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.

MANOMETERS
Precision Thermometer & Instrument Company.

MANTLES
General Gas Light Co.
Welsbach Company.

MASKS—GAS
Safety Gas Main Stopper Co.

MAST & GAFF OUTFITS
Geo. Haiss Mfg. Co.
C. W. Hunt Co., Inc.

MEASURING CHUTES
C. W. Hunt Co., Inc.

MECHANICAL GENERATORS for Water Gas App.
United Engineers & Constructors, Inc.

METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
D. McDonald & Co.
Maryland Meter Works.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.

METER DIAPHRAGM GRAPHITE
Joseph Dixon Crucible Company.

METER REPAIRING
Lambert Meter Co.

METER TESTER, Hydro-Pneumatic
American Meter Co.

METERS
Pittsburgh Equitable Meter Co.
Air
American Meter Co.
Connersville Blower Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
Neptune Meter Co.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Artificial
American Meter Co.
Connersville Blower Co.
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
Neptune Meter Company.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Nathaniel Tufts Meter Works.
Demand
American Meter Co.
Connersville Blower Co.
John J. Griffin & Company.
Lambert Meter Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Exhibition
American Meter Co.
Natural Gas
American Meter Co.
Connersville Blower Co.
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Meter Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Oil
American Meter Co.
Connersville Blower Co.
The Gas Machinery Co.
Orifice
American Meter Co.
Positive
The Sprague Meter Co.
Prepayment
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Proportional
The P. H. & F. M. Roots Company.
Station
American Meter Co.
Connersville Blower Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
Nathaniel Tufts Meter Works.
The Western Gas Construction Company.
Steam
American Meter Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company
Test
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Wet Test
American Meter Co.

MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.

MIXERS, GAS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.

MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.

MOTOR CARS
C. W. Hunt Co .,Inc.

NAPHTHALENE EXTRACTORS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

OFFICE FURNITURE
Remington Rand, Inc.

ORE, CHROME
E. J. Lavino & Co.

OVEN SHELF; SAFETY
Wm. Parke, Inc.

OVENS—COKE AND GAS
Carl Still, Inc.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

OXIDE
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.

OXYGEN AND HYDROGEN METERS
Lambert Meter Co.

PACKING
Asbestos
Safety Gas Main Stopper Co.

PAINTS
Joseph Dixon Crucible Company.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Semet-Solvay Co.

PAINTS, ANTI ACID AND ALKALI
Quigley Furnace Spec. Co., Inc.

PAINTS, RUSTPROOF
Quigley Furnace Spec. Co., Inc.

PHOTOMETERS
Connelly Iron Sponge & Governor Co.

PIPE
National Tube Co.
The Stacey Mfg. Co.
Bell
American Meter Co.
Semet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
American Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
American Cast Iron Pipe Co.
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Centrifugal
American Cast Iron Pipe Co.
Flange
American Cast Iron Pipe Co.
James B. Clow & Sons.
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
McWane Cast Iron Pipe Co.
Seamless Steel
Pittsburgh Steel Products Co.
Spigot
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Steel
Bartlett-Hayward Co.
James B. Clow & Sons.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Pittsburgh Steel Products Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Welded Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.

PIPE COATINGS
Wailes Dove-Hermiston Corp.

PLANTS—GAS, COMPLETE
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

PLATES
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.

PLUGS, SERVICE AND MAIN
Rubber
Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.

PORTABLE TEST METERS
Lambert Meter Co.

PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PRODUCER GAS STEAM
American Meter Co.

PROVERS—Critical Flow for H. P. Field Testing
American Meter Co.

PROVERS—METER
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.

PUMPS
Drip
American Meter Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Gas
The P. H. & F. M. Roots Company.
Gas Bag
Safety Gas Main Stopper Co.
Hand
Lambert Meter Co.
Oil
Connersville Blower Co.
The Gas Machinery Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Power
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Pressure
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Service
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
Service Cleaner
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.
Tar
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Water
Connersville Blower Co.
The P. H. & F. M. Roots Company.
Vacuum
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Connersville Blower Co.
The P. H. & F. M. Roots Company.

PUMPS—LIQUID ROTARY
The P. H. & F. M. Roots Company.

PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas. Const. Co.
The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

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Rate at $5.00 per inch for first insertion. $4.00 per inch for each additional insertion of same Copy. Positions wanted—$2.00 per issue.

DIVIDEND NOTICE

American Light & Traction Company

DIVIDEND NOTICE

The Board of Directors of American Light & Traction Company, at a meeting held October 9, 1928, declared a CASH DIVIDEND of 1⅛ per cent (1⅛%) on the Preferred Stock, a CASH DIVIDEND of 2 per cent (2%) on the Common Stock, and an extra CASH DIVIDEND of 2 per cent (2%) on the Common Stock, all payable November 1, 1928, to stockholders of record at the close of business October 18, 1928.

The Transfer Books will close at 3 o'clock P. M., October 18, 1928, and will reopen at 10 o'clock A. M. October 30, 1928.

JAMES LAWRENCE,

FOR SALE

One station meter in cast iron case, 10 ft. 9⅞ in. by 10 ft. 5½ in. inside diameter. Front and back heads 11 ft. 2 in. diameter by 1¼ in. thick. Back head carries two outlet connections for 16 in. pipe and one inlet for 20 in. pipe. The case contains one Hinman drum 9 ft. in diameter, built in 1926. The dial train and all gauges were renewed in 1926, when the new drum was built. The meter has a capacity of 70,000 cu. ft. per hour at 1" differential pressure. Address New Haven Gas Light Co., New Haven, Conn.

POSITION WANTED

University Graduate with eighteen years' experience in the gas industry and some electric experience, seeks position as manager of property with at least 5,000 meters. Address Box 948, care American Gas Journal, 53 Park Place, New York City.

Back Issues Wanted

The Library of Congress of the United States is desirous of securing the back issues of the American Gas Journal enumerated below to complete the set upon its shelves. They would greatly appreciate the gift to the library of any or all of the following of these publications.

Vol. 120,

No. 8—Feb. 23, 1924.
No. 9—Mar. 1, 1924.
No. 10—Mar. 8, 1924.
No. 11—Mar. 15, 1924.
No. 15—Apr. 12, 1924.
No. 17—Apr. 26, 1924.
No. 25—June 21, 1924.
No. 26—June 28, 1924.

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No. 2—July 12, 1924.
No. 4—July 26, 1924.
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No. 7—Aug. 17, 1924.
No. 8—Aug. 23, 1924.
No. 14—Oct. 4, 1924.

Also title page and indexes for vols. 120-121-125-127. 1924-26.

Free mailing labels, which may be used to forward such numbers as you are willing to present will be sent to those communicating with the American Gas Journal.

EMPLOYMENT SERVICE

To Those Desiring a Position

Register your name with the American Gas Journal if you contemplate making a change in your present position.

We frequently hear of vacancies in the industry which might interest you.

To the Gas Companies

When vacancies occur in any of the various departments of your organization, communicate with us, we may have the man you want.

The service is each case is both free and confidential.

AMERICAN GAS JOURNAL.

GEORGE H. WARING
CONSULTING ENGINEER
624 GRAND RAPIDS NATIONAL BANK BLDG.
Grand Rapids, Mich.

Buyers' Reference Index

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PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PYROMETERS
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.
James B. Clow & Sons.
Gas Water
James B. Clow & Sons.

RANGES—GAS
American Stove Co.

RECORDING DEMAND METERS
Lambert Meter Co.

REFRACTORY CEMENTS
Botfield Refractories Company
Joseph Dixon Crucible Company
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.

REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.

REFRACTORY LININGS
Alpha-Lux Company
Botfield Refractories Company
Joseph Dixon Crucible Company.
The Gas Machinery Co.
Improved Equipment—Russell Engineering Corp.
Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company

REGULATORS
American Meter Co.
The Chaplin Fulton Mfg. Co.
Connersville Blower Co.
Connelly Iron Sponge & Governor Co.
Grobie Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Oxygen & Acetylene
Alexander Milburn Co.
Steam Pressure
Smoot Engineering Corp.

REPAIR PARTS
Lambert Meter Co.

RESPERATING OUTFITS
Connelly Iron Sponge & Governor Co.

RETORTS
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Improved Equipment—Russell Engineering Corp.
Vertical
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West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
The Gas Machinery Company

RETORT CEMENT
Alpha-Lux Company
Botfield Refractories Company
Joseph Dixon Crucible Company
The Gas Machinery Co.
Improved Equipment—Russell Engineer Corp.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.

REVERSE FLOW GOVERNORS
Connelly Iron Sponge & Governor Co.

REYNOLDS
District
Reynolds Gas Regulator Co.

RUBBER AND JUTE JOINTING MATERIALS
Southwestern Pipe Joint & Eng. Co. Inc.

SAFES
Remington Rand Inc.

SAFETY VALVES
Connelly Iron Sponge & Governor Co.

SCREENS
Robins Conveying Belt Co.

SCREENS, ELECTRIC VIBRATING
C. W. Hunt Co. Inc.

SCRUBBERS
Bartlett Hayward Co.
Cruse-Kemper Company
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Company

SERVICE BOXES
James B. Clow & Sons.
The Stacey Mfg. Co.

SERVICE CLEANERS
American Meter Co.

SERVICE PLUG-RUBBER
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

SHELVING (Steel)
Remington Rand Inc.

SKIP HOIST
C. W. Hunt Co. Inc.

SPECIFIC GRAVITY APPARATUS
American Meter Co.

SPECIFIC GRAVITY GAUGES
Alpha-Lux Company.

SPONGE
Alpha-Lux Company
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co. Inc.

SPRAYS, for Water Gas Machines
Semet-Solvay Engineering Corp.

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Alexander Milburn Co.

STACEY BULLETT for High Pressure Storage
Stacey Bros. Gas Construction Co.

STATION METERS
Maryland Meter Works
D. McDonald & Co.
Metric Metal Works

STEAM ACCUMULATORS
(See Accumulators—Steam)
The Gas Machinery Co.
Smoot Engineering Corp.
United Engineers & Constructors Inc.
The Western Gas Construction Company

STOP COCK GREASES
Joseph Dixon Crucible Company

STOPPERS
Safety Gas Main Stopper Co.

STRAINERS—GAS, STEAM, WATER
Andale Company

STREET DEPT. EQUIPMENT
American Meter Co.
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

STREET LAMPS
General Gas Light Co.
Welsbach Street Lighting Co.

SULPHUR AND AMMONIA TEST (Apparatus)
American Meter Co.

SYSTEMS
Combustion Control
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
Turbo-Gas Boosters and Exhausters.
Turbo-Generators.
Amer. Brown Boverie Elec. Co.
Hot Water Heat Control
The Cleveland Heater Company

TABULATING MACHINES
Remington Rand, Inc.

TACHOMETERS
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.

TANK REGULATORS
Reynolds Gas Regulator Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Company.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Gas, Oil, Storage
Stacey Bros. Gas Const. Co.
High Pressure
The Gas Machinery Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.

TAPE SOAP—BINDING
Safety Gas Main Stopper Co.

TAR DISTILLING PLANTS
Carl Still, Inc.
Gas Engineering Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.

TAR DISPLACEMENT SYSTEM
The Gas Machinery Co.

TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

TEMPERATURE CONTROLING DEVICE—Oven
American Stove Co.
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Robertshaw Thermostat Co.
Taylor Instrument Companies.

TESTING APPARATUS, GAS
American Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.

THERMOMETERS
American Meter Co.
The Bristol Company.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Superior Meter Co.
Taylor Instrument Companies.

THERMOSTATS
The Bristol Company.
The Cleveland Heater Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Precision Thermometer & Instrument Company.
Robertshaw Thermostat Co.
Taylor Instrument Companies.

TOASTERS
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Semet-Solvay Engineering Corp.

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Alexander Milburn Co.

TRAPS—STEAM
James B. Clow & Sons.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.

TRENCH DIGGERS
The Cleveland Trencher Co.
Geo. Haiss Mfg. Co., Inc.

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National Tube Co.
Pittsburgh Steel Products Co.

TUBES
Seamless Steel
Pittsburgh Steel Products Co.

TURBO-BLOWERS & COMPRESSORS
American Brown Boveri Elec. Corp.

TYPEWRITERS
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Remington Rand, Inc.

U GAUGES
American Meter Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Safety Gas Main Stopper Co.
Superior Meter Co.
Taylor Instrument Companies.

VACUUM GAUGES
American Meter Co.
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

VALVES
Bartlett-Hayward Co.
James B. Clow & Sons.
Consolidated Ashcroft Hancock Co., Inc., American Schaeffer & Budenberg Corp. Div.
The Gas Machinery Co.
Groble Gas Regulator Co.
C. W. Hunt Co., Inc.
The Ludlow Valve Mfg. Co.
Pittsburgh Equitable Meter Co.
Semet-Solvay Engineering Corp.
High Pressure Special
Smoot Engineering Corp.

VALVES—BY-PASS
The P. H. & F. M. Roots Company.

VALVES—DIAPHRAGM
The P. H. & F. M. Roots Company.

VALVES & FITTINGS
James B. Clow & Sons.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.

VALVES—HUNTOON
The P. H. & F. M. Roots Company.

VALVES—RELIEF
The P. H. & F. M. Roots Company.

VALVES—3 Way
Semet-Solvay Engineering Corp.

WASTE HEAT BOILERS
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Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

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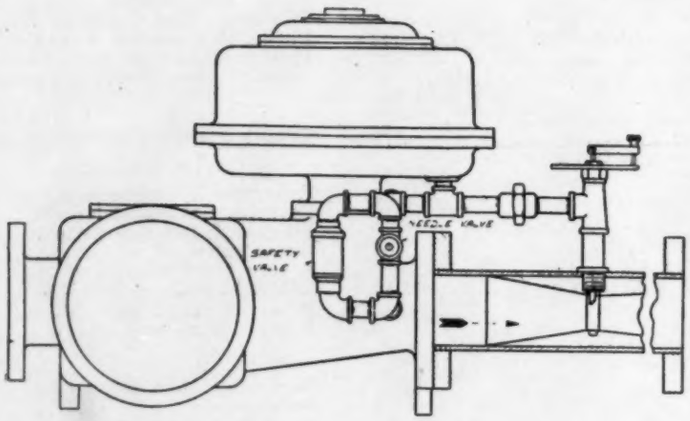

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